Chemical Week

November 17, 1956

Price 35 cents

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Hanley research team zeros in on cost-cutting, fluid hydrogenation catalysts . . . . . p. 104

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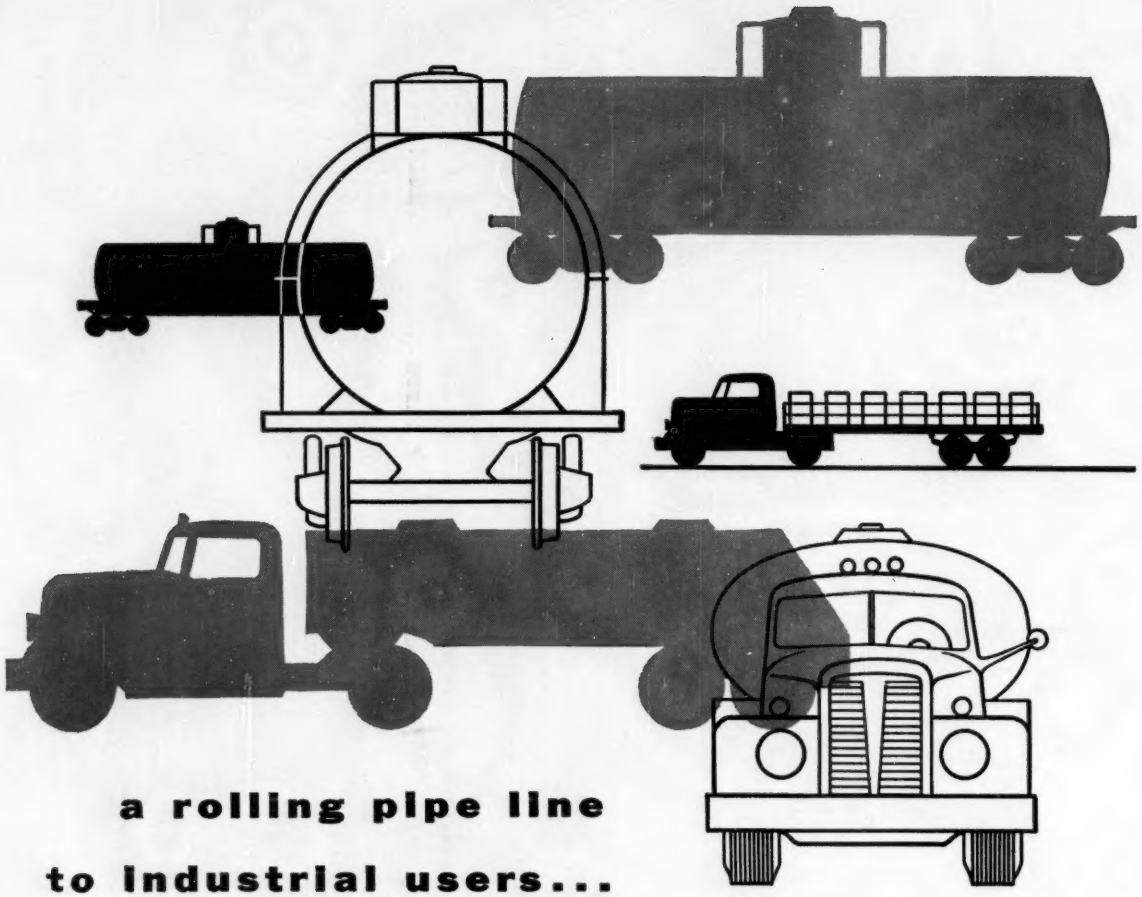

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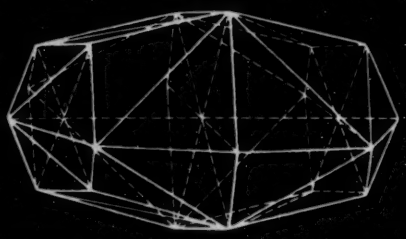

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Chemical Week

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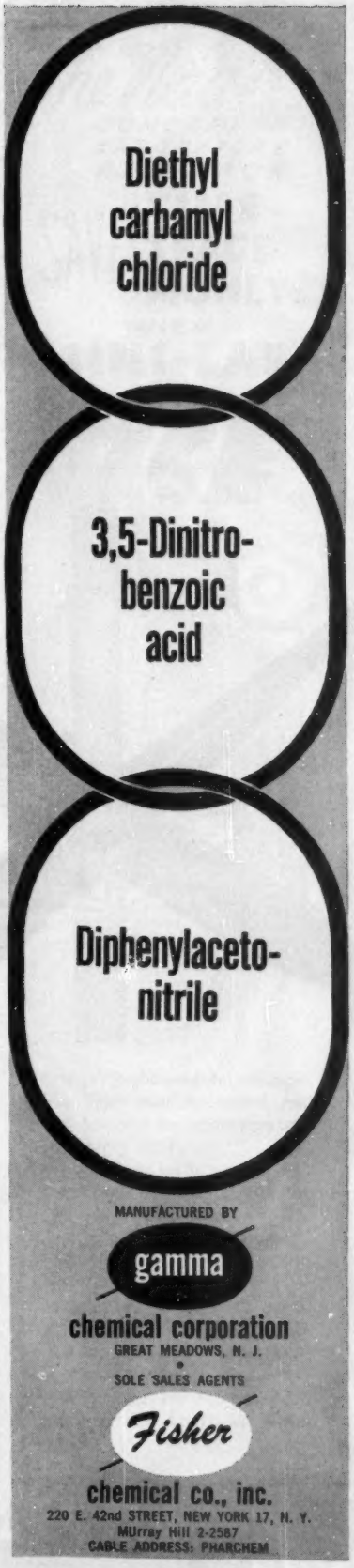

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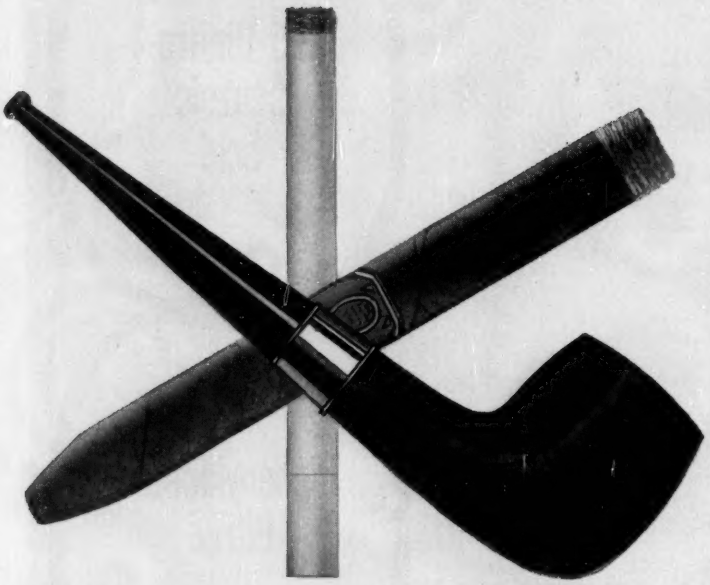

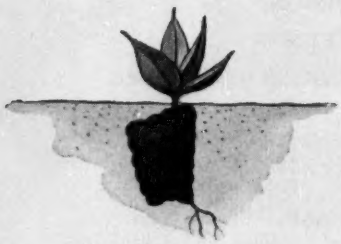

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November 17, 1956 *Vol. 79, No. 20*

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Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), founder. Executive, Editorial and Advertising Offices, McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office: 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi; Executive Vice-President and Treasurer; Hugh J. Kelly, Executive Vice-President; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President. Publications Division: Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; J. E. Blackburn, Jr., Vice-President and Circulation Director.

Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., N. Y., or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.

Single copies 35¢. Subscription rates—United States, United States Possessions and Canada, $3.00 a year; $4.00 for two years; $5.00 for three years. Other Western Hemisphere countries, $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries, $25.00 a year; $40.00 for two years; $50.00 for three years.

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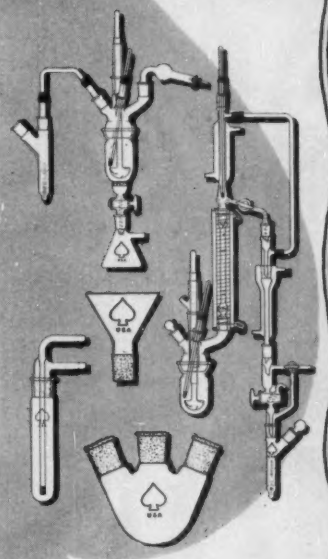

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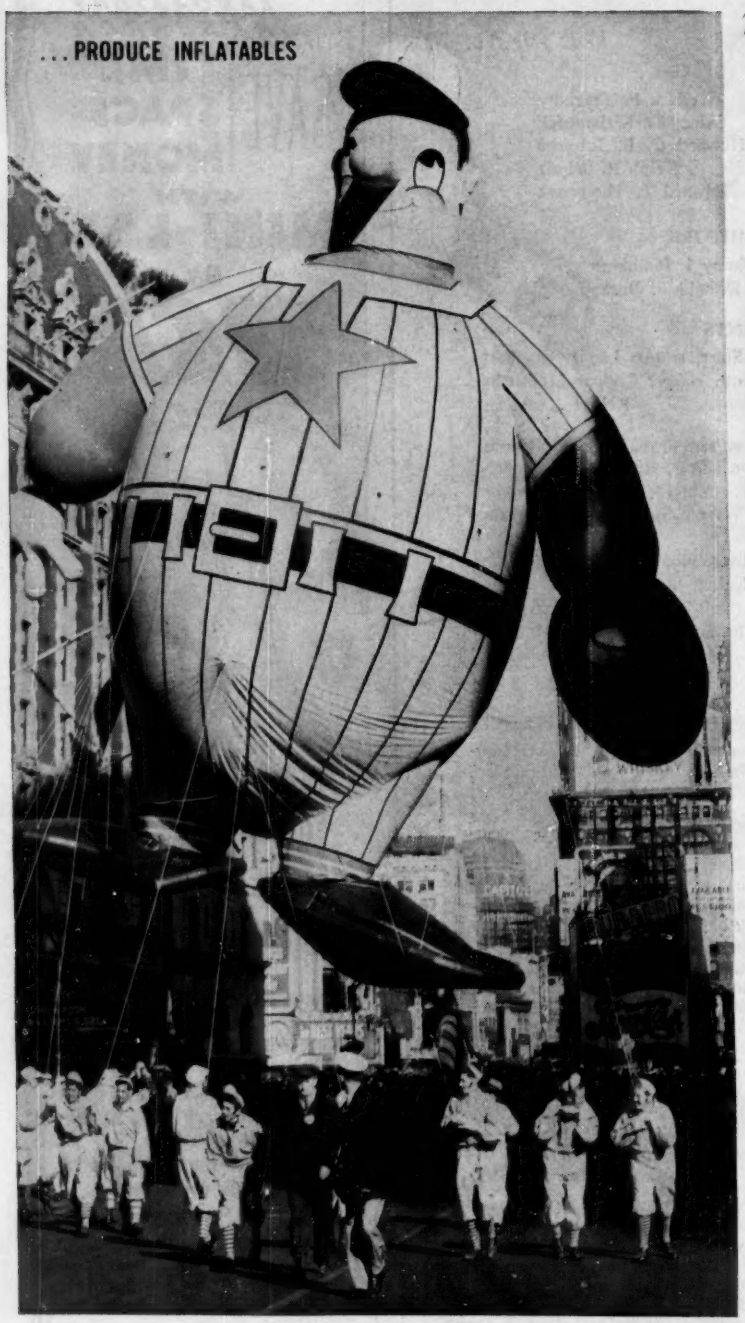
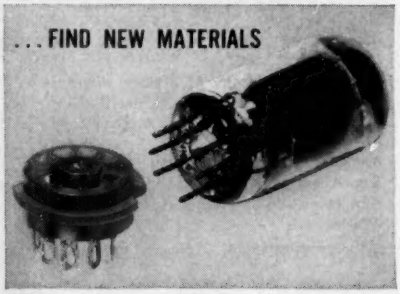


NO TOY, THIS—This 46-foot giant delights the young but is hardly a plaything. Many of the smaller inflatables today are plastic, and such products as Hercules Hercoflex® serve as a plasticizer in vinyls to improve their quality, help provide the durability that means longer life.

NAIL POLISH REMOVER is just one of the many end-use products that rely on acetone. Hercules' new plant in Gibbstown, N. J., where phenol, acetone and other oxychemicals are produced by the cumene process, is a leading source of supply in tank cars or tank trucks.



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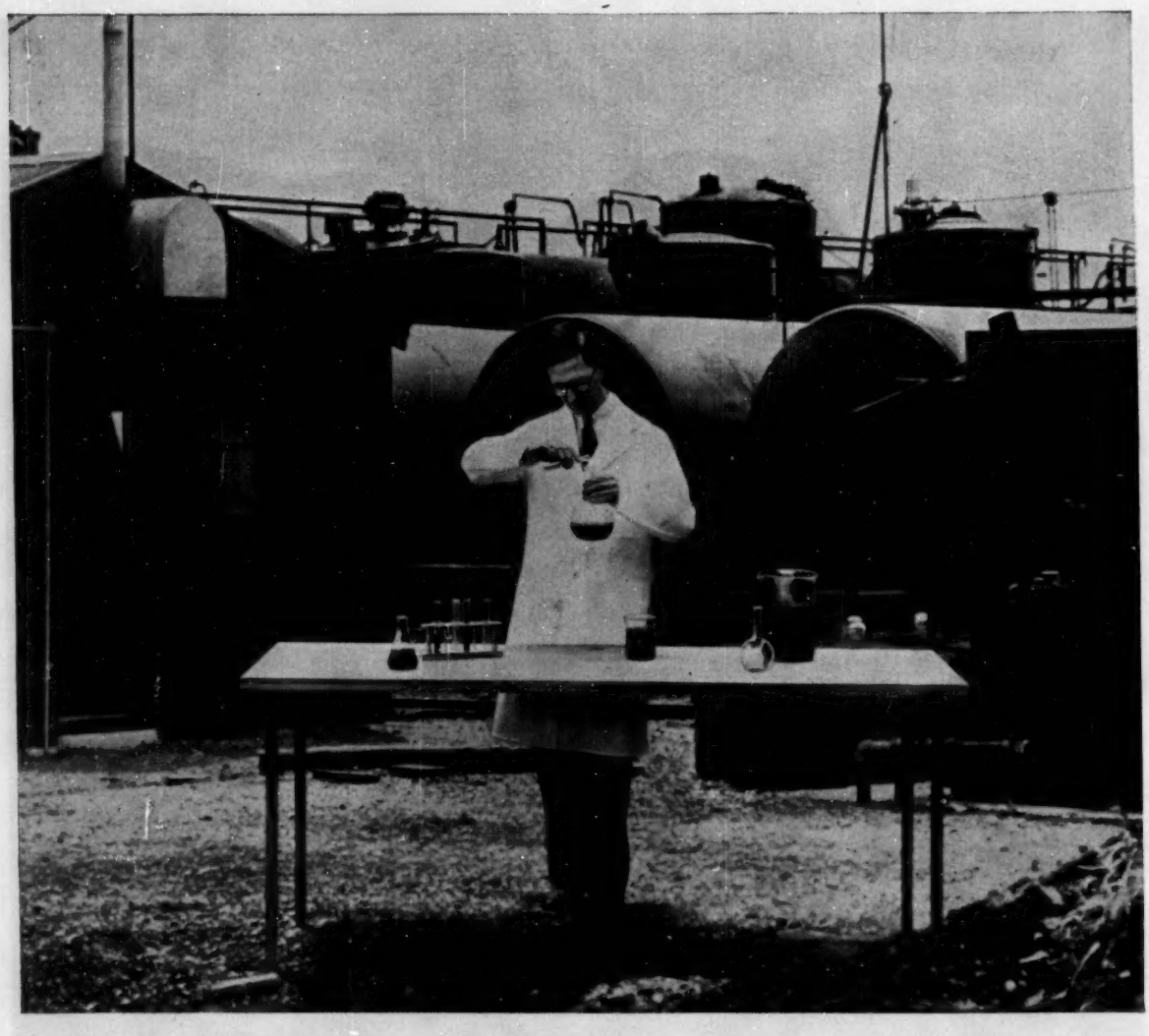

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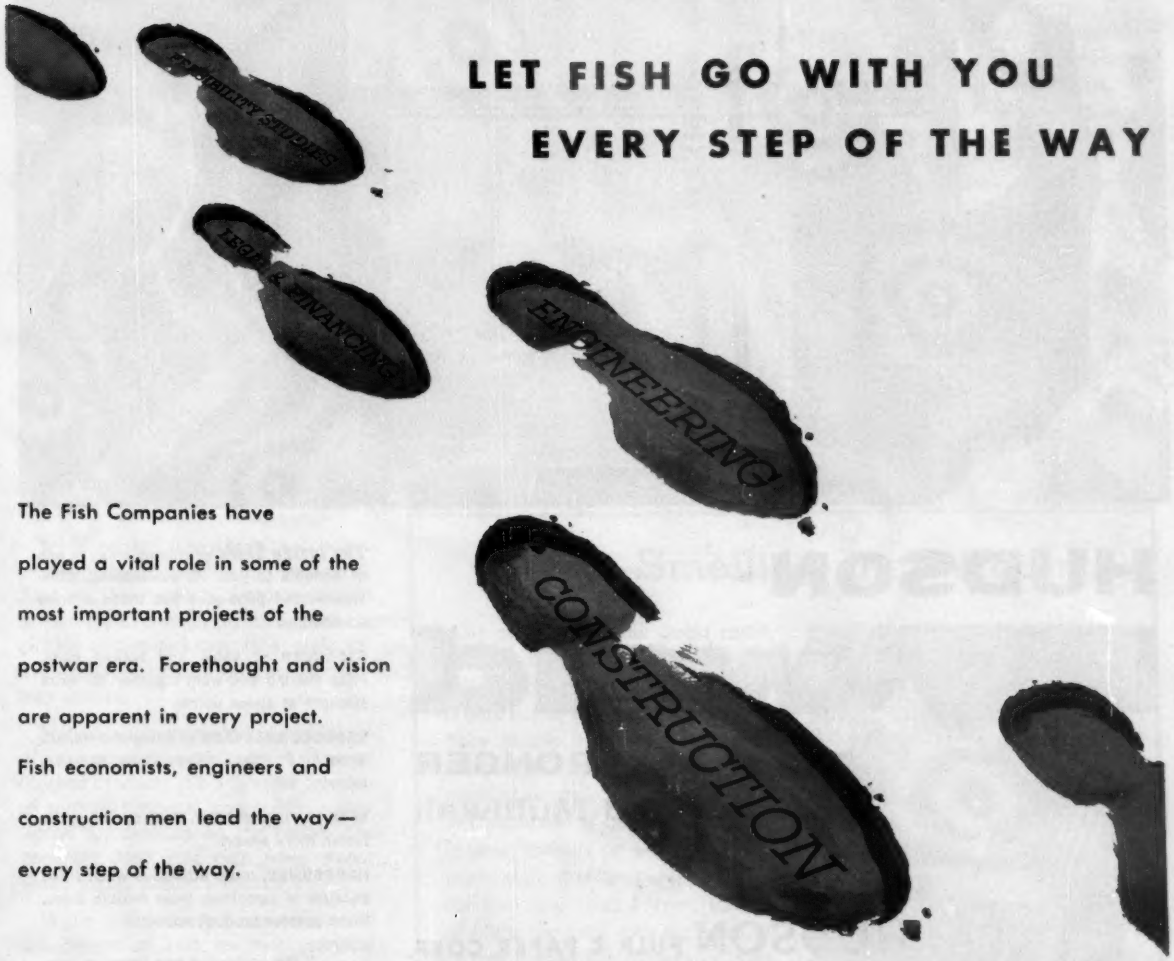

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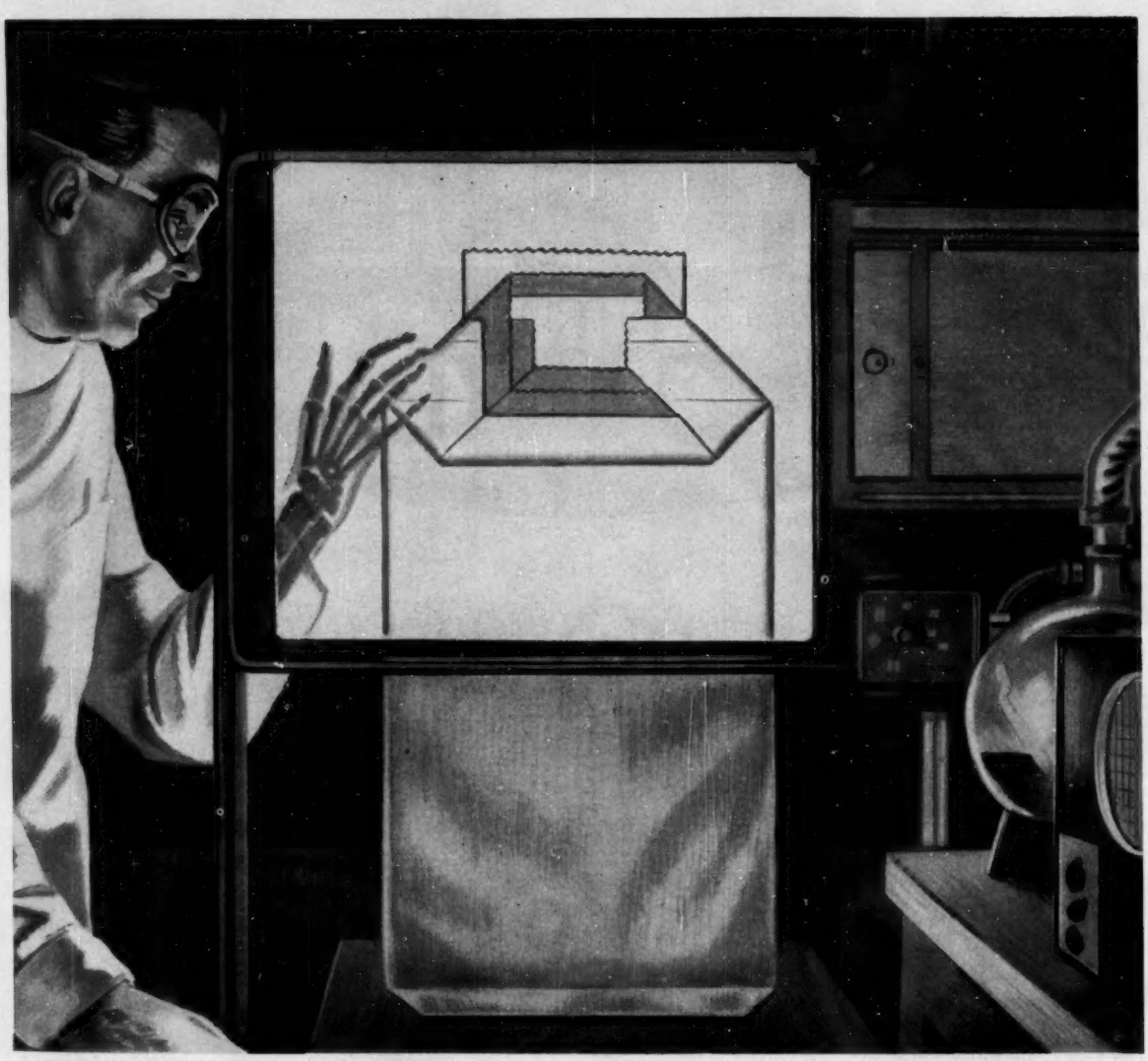

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Sodium Benzoate: Rust fighter for water-base products

It's easy to overlook the obvious. But not for long. Consequently, packagers of water-base paints, household detergents, adhesives, and various aerosols now find themselves blinking over the low cost and effectiveness of this obvious sleeper in the woodpile of corrosion inhibitors.

While aerosol fillers beat their breast over container-corrosion problems (CW, June 16, '56), sodium benzoate—which is non-toxic enough to be added to pickles and sauerkraut as a preservative—rests peacefully on their laboratory shelves.

Not so in the metals industry. Makers of steel products simply dip their shiny finished products in a 5% water solution of sodium benzoate and create a protective anodic film on the metal. The products don't rust even when stored under highly humid conditions.

While stainless steel has eliminated the danger of rust on most surgical instruments immersed in disinfectants—the packagers of the disinfectants who add 1.5% of sodium benzoate can boast a NON-RUSTING sterilant they can package in metal.

Although PVA and other water-base paints have largely solved container corrosion with can linings, "pin holes" or scrapes from mixing often play havoc with the product after long storage or when shelved after partial use. As little as 1% sodium benzoate in the product insures against container corrosion AND adds an extra merchandising benefit: Paint film containing benzoate applied over nails, fasteners, and metal stripping helps control rusting that bleeds through vapor-permeable coatings.

Manufacturers of antifreezes, too, are taking a new look at sodium benzoate because it protects against the corrosion promotion of dissimilar metals in contact in water. As little as 1.5% sodium benzoate plus 0.1% sodium nitrite inhibits both alcohol and ethylene glycol antifreezes.

So powerfully does sodium benzoate vaccinate against corrosion that 2-5% in wrapping paper (plain or waxed) is enough to protect needles, razor blades, mild steel strip, tools, instruments, and machine parts. Such wrappings eliminate the need for oiling or greasing because a bright steel fan shaft, for example, will stay rust-free in the wrappings even when stored in a damp cellar for 13 weeks.

Two booklets on the subject are available: "Sodium Benzoate as a Corrosion Inhibitor" and "Sodium Benzoate . . . Corrosion Inhibitor for Water-Base Paints." For copies, write: MONSANTO CHEMICAL COMPANY, Dept. CS-4, Organic Chemicals Division, St. Louis 1, Missouri.

Sweet-Smelling Incinerator

By copying a swank desert resort that had to burn its refuse aromatically, specialty marketers are making profits out of backyard incinerators. They simply repackage Monsanto Santomask II (a long-established odor-masking agent) in 1-lb and 5-lb. cans. The home owner sprinkles the liquid product liberally on a wad of newspaper and tosses the paper *on top* of the backyard trash burner. Instead of filling the yard with the smell of charred refuse, the incinerator gives out a pleasant aroma.

Santomask: Reg. U. S. Pat. Off.

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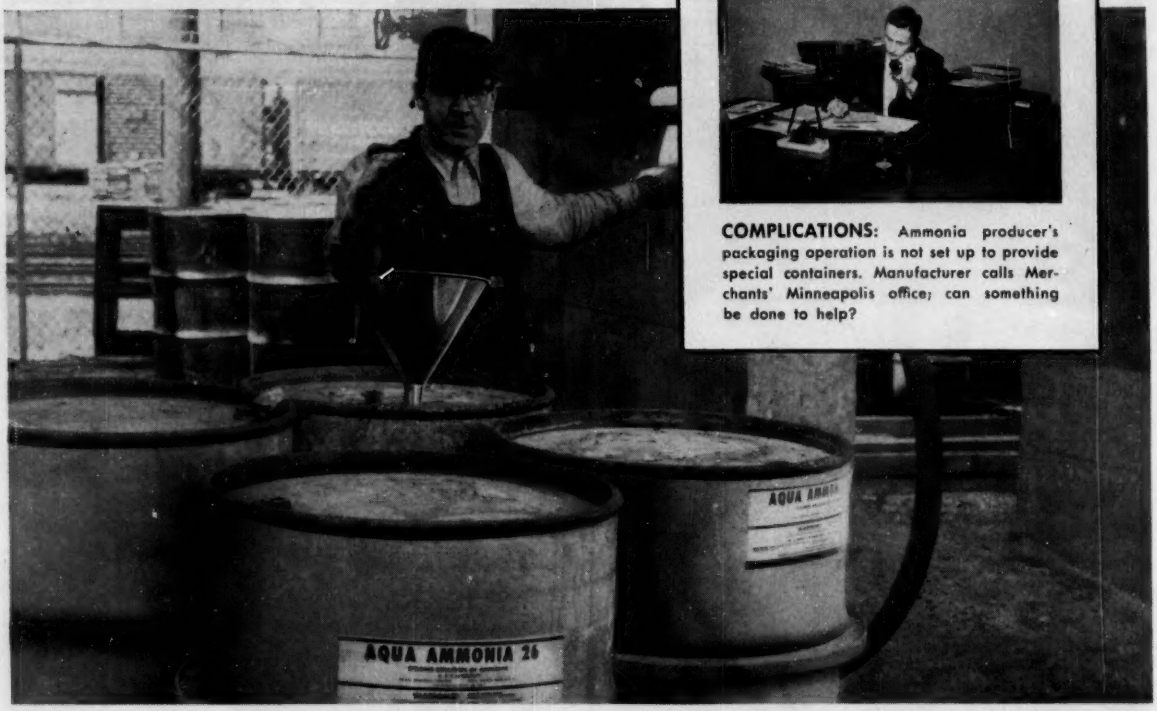
PROBLEM: National manufacturer in St. Paul discovers that traces of iron impurities are causing high rate of product rejects. The culprit — rust from aqua ammonia shipped in conventional steel drums.

COMPLICATIONS: Ammonia producer's packaging operation is not set up to provide special containers. Manufacturer calls Merchants' Minneapolis office; can something be done to help?



SOLUTION: Merchants sends over its own stainless steel drums and polyethylene containers for filling by the ammonia producer, delivers them to the manufacturer. Contamination problem is licked, thanks to Merchants' most important product — *service*.

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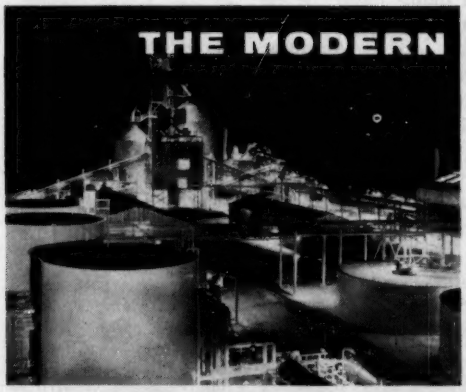

San Antonio, Texas plant of American Lithium Chemicals, Inc., processing lepidolite ore into lithium hydroxide and other chemicals.

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OPINION

To Success

TO THE EDITOR: Congratulations on your excellent article on our standards program. . . . your report . . . contributes tremendously to its success, since your magazine reaches so many of those involved.

J. S. FASSETT
Director, Service Dept.
American Hotel Assn.
New York

For Texans Only

TO THE EDITOR: CHEMICAL WEEK failed to print the important factor that purchase of our stock is restricted entirely to residents of the state of Texas.

RALPH R. DEAN
Worth Chemical Products Co.
Fort Worth

Riddle Solved

TO THE EDITOR: I have read with a great deal of interest your article, "More Riddles for Rosin" . . .

There would be no riddles for rosin, if it would carry on the type and kind of research work needed to prove that it can do more for the lumber industry, especially pine lumber, than any other factor you might say . . .

Sap pine lumber can be made as near like heart lumber as it is humanly possible to do so, with the help of Mother Nature, through the proper impregnation of the basic elements of heart pine lumber, the chief one being gum rosin . . .

The writer has not been in a position to do the kind of scientific research work to absolutely prove this statement, but what he has done makes him feel confident that gum rosin's future lies in building up and preserving wood so it can become and remain very competitive. . .

As for a market for rosin, wood preserving could and would use every ounce that could be produced, including that which could be produced by paper mills, pine stumps, as well from the live pine trees.

Producers and processors of gum rosin have been more interested in getting the government to keep gum rosin on a stabilized basis.

ALEX P. SULLIVAN
Savannah, Ga.

MEETINGS

Manufacturing Chemists' Assn., mid-winter conference, Statler Hotel, New York, Nov. 20.

National Foreign Trade Council, annual convention, Waldorf-Astoria, New York, Nov. 26-28.

American Institute of Consulting Engineers, annual dinner, Waldorf-Astoria, New York, Nov. 27.

American Chemical Society, 9th National Chemical Exposition, Cleveland Public Auditorium, Cleveland, Nov. 27-30.

Armour Research Foundation and others, International Ozone Conference, Hotel Sheraton, Chicago, Nov. 28-30.

Synthetic Organic Chemical Manufacturers Assn., annual meeting and dinner, Biltmore Hotel, New York, Dec. 3.

Air Pollution Control Assn., semiannual meeting, Rice Hotel, Houston, Dec. 3-5.

Society of the Plastics Industry, Inc., 7th film, sheeting and coated fabrics division conference, Commodore Hotel, New York, Dec. 4-5.

American Institute of Chemical Engineers, annual meeting, Statler Hotel, Boston, Dec. 9-12.

American Nuclear Society, winter meeting, Sheraton-Park Hotel, Washington, Dec. 10-12.

American Pharmaceutical Manufacturers' Assn., midyear and eastern section meeting, Waldorf-Astoria Hotel, New York, Dec. 10-12.

American Assn. for the Advancement of Science, 123rd meeting, Statler Hotel, New York, Dec. 26-31.

Society of Plastics Engineers, annual technical conference, Sheraton-Jefferson Hotel, St. Louis, Mo., Jan. 16-18.

Assn. of American Soap and Glycerine Producers, annual convention, Waldorf-Astoria Hotel, New York, Jan. 23-25.

Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh, March 4-8.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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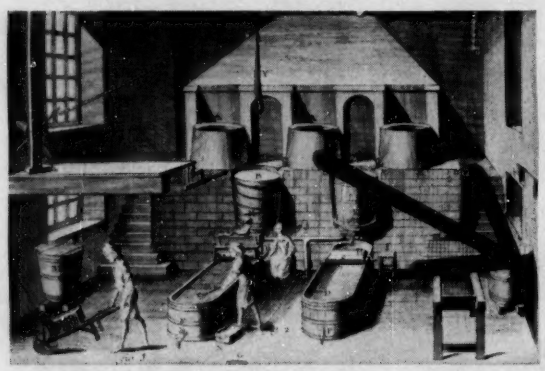
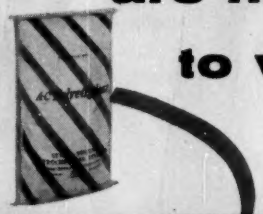


Important new things are happening to waxes



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Cosmetics	Plastics
Crayons	Polishes, liquid and paste
Dairy cartons	Potting compounds
Fibre drums and cups	Printing ink
Fruit and vegetable coatings	Textile size
Glass bottle coatings	Tile, asphalt, cork and rubber
Industrial coatings	Wax blending
Insecticide spray	Wire and cable
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Business Newsletter

CHEMICAL WEEK
November 17, 1956

Expansion and more expansion. That's the only way that you can characterize the outlook of the chemical process industries. Look at this week's record—

American Potash plans a sodium chlorate plant in the East. It will build a 15,000-tons/year plant at one of three sites in upper Mississippi or Alabama, will begin production early in '58. The plant will mark Ampot's first manufacturing venture in the eastern U. S.

Ethylene units for Commercial Solvents and Jefferson Chemical are on the way.

Commercial Solvents and Columbia Gas System, which have been jointly studying the manufacture of ethylene, as well as ethyl alcohol, ethylene oxide and glycol, and other hydrocarbon derivatives, will likely build a $40-50-million plant in the Ohio Valley—probably on the Kanawha River near Charleston, W. Va.

The companies hope that construction can begin early in '57—once the Federal Power Commission authorizes a gas supply for the plant. A new company, half-owned by each firm, would be formed to operate the plant. Gas would come from nearby reserves owned or controlled by Columbia; CSC would handle the technological and marketing phases of the operation.

Jefferson Chemical has taken the wraps off its new, $38-million expansion (*CW Business Newsletter, Oct. 20*) at Port Neches, Tex. It will triple ethylene-making facilities, double ethylene glycol capacity, increase its ethylene oxide capacity 50%. The new oxide unit will use the direct oxidation route, though operation of the firm's older chlorhydrin units will continue. Jefferson, too, will install diaphragm cells for making chlorine for this process and for use in making ethylene dichloride. (Its caustic will be sold, but hydrogen will be used within Jefferson's plant complex.)

Jefferson, in addition to entering "new fields based on ethylene," will begin production of propylene oxide, glycol and other propylene derivatives. Output of ethylene oxide specialties and specialty amines such as morpholine will also be stepped up.

Dow, which has a sizable ethylene derivative expansion in progress at Freeport, Tex., will, for the first time, make ethanolamines.

Among other expansions—National Lead will add 25,000 tons/year of titanium dioxide pigment capacity at its St. Louis, Mo., plant. International Nickel will exploit its nickel deposits in the Moak Lake, Manitoba, area. Total cost may reach $150 million. Pittsburgh Metallurgical

plans to install a second large rotating electric ferrosilicon furnace at Calvert City, Ky.

There's a chance that a German chemical firm may locate in Texas. That's the indication, following a visit by top officials of Wasag-Chemie, A. G., to the Houston area. They viewed plant sites along Houston's ship channel, at Texas City and in the Beaumont-Orange-Port Arthur area. Any such plant would likely be built in partnership with an American firm. Wasag is a large munitions and plastics maker in Germany and has, among other things, a technical information exchange agreement with Celanese.

There's a potential expansion ahead in polyvinyl chloride. U. S. Industrial Chemicals Division of National Distillers is studying a 50-million-lbs./year plant to produce PVC and a copolymer.

•

An encouragement to industrial development near the Tule Lake Ship Channel at Corpus Christi, Tex., has been offered by Columbia-Southern Chemical Corp., which has a plant there. The firm says it is willing to pay the full cost of dredging a new turning basin on the channel —if such a cost doesn't exceed $500,000.

•

The proposal to "unitize" oil and gas production in California, supported by six major oil companies (*CW, Jan. 28, p. 34*) failed at the polls last week. California voters, by a 3-to-1 margin, turned down amendment to the state constitution that would have legalized such regulation.

•

What's chemical industry reaction to Eisenhower's re-election? Here are some comments:

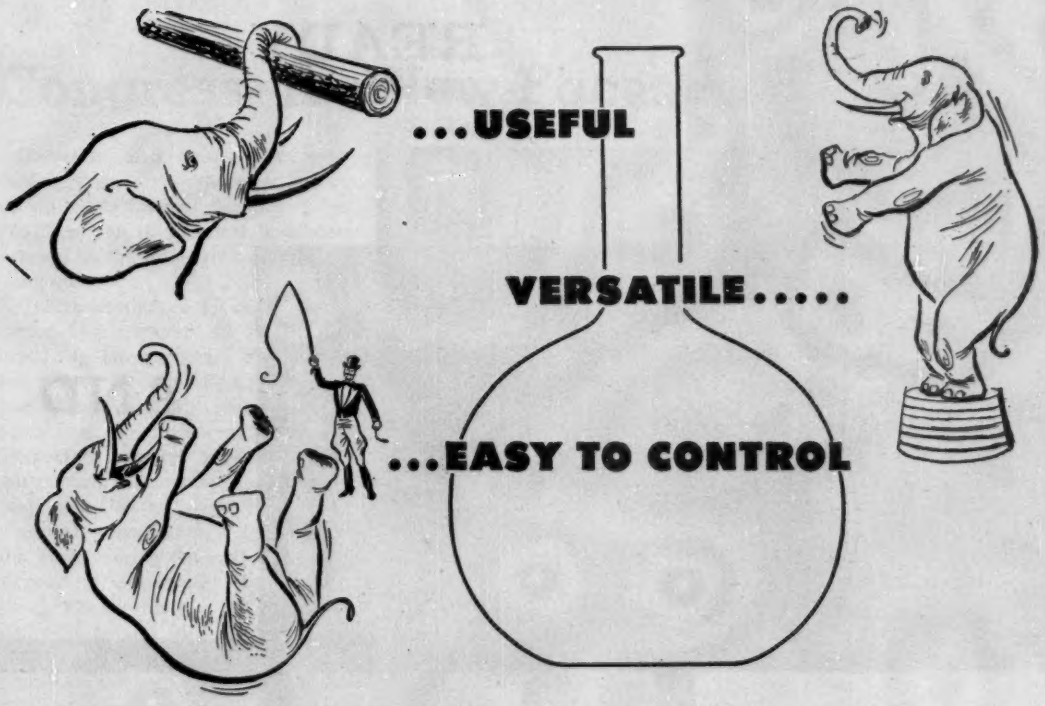
"I'm jubilant," reports International Minerals & Chemical President Louis Ware. "It's a wonderful thing."

I think the businss climate will be more favorable," reports J. D. McPherson, Jefferson Chemical vice-president; "therefore we won't change our plans, . . . will feel more confident."

"I think a Democratic victory would have been harmful to the business climate," reports California Spray-Chemical's Earl Cannon. "I'm not happy about the Democratic Congress (*see also p. 21*), but at least we're no worse off than we were before. The election outcome doesn't change our plans, because we were confident of an Eisenhower victory."

"Well, of course, the Republicans didn't really win—Ike did; but I'm glad some of the other people were successful in riding into office on his coattails," reports the president of one phosphate chemicals company. "As a result of the election, we're going to go ahead with expansion plans. Had it been otherwise, it's doubtful we'd be going ahead with these plans."

SODIUM HYDRIDE



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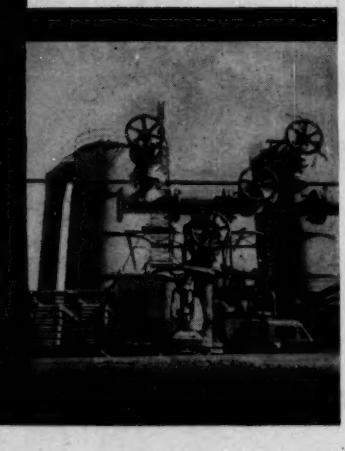

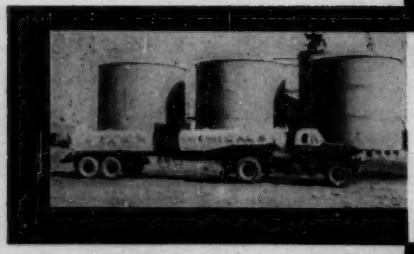

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Congress—the New Faces of '57

Chemical men this week were starting their every-other-year game: attempting to forecast the pattern for 1957 and '58 in chemical legislation —based on the framework of the new Congress.

The re-election of a Congress controlled by Democrats means that the broad legislative policies of the past two years will be in effect for at least two more years. But there are new faces and new balances among the Democrats heading legislative committees and subcommittees, and they may significantly affect matters of chemical interest that will be up for discussion during the next two years. Legislators who have played subordinate roles in the past will now have definitive control over specific legislation. A committee or subcommittee chairman, by merely deciding the order in which various bills come up for hearings—or whether they come up at all—can set the stage for Congressional action.

WIDE WORLD

REPRESENTATIVE HARRIS: New face on a chemically crucial committee.

Commerce Consideration: Of course, no single committee can be considered typical, but the current situation on the House Interstate & Foreign Commerce Committee gives a fair example of the difficulties faced by those who must assess the importance of Congressional action.

Here, Rep. Oren Harris of Arkansas moves up to the chairmanship, replacing the late Percy Priest. A big question for chemical men is whether Harris will organize his group as Priest did with three subcommittees. If he does, one of them—with responsibility for science and health—will again take up the controversial issue of chemicals in foods. It will have several new members. In the 84th Congress, Priest himself headed the 12-member health subcommittee—a group equally divided between Democrats and Republicans. In January, the 85th Congress will see one vacancy on the Republican side—that of Rep. Richard Hoffman of Illinois.

Besides Priest, another of the six Democractic members who will not be back is the subcommittee's second-ranking Democrat, Rep. F. Ertel Carlyle of North Carolina, who was defeated in the primary election. Return of a third—Rep. Martin Dies of Texas—is doubtful.

Dies, a thorn in industry's side in last spring's hearings on the Food Additive Bill, may run for the Senate in a special December election to fill the seat vacated when Sen. Price Daniel won the Texas governorship.

The No. 3 Democrat on last year's subcommittee, Rep. Kenneth A. Roberts of Alabama, will be back, but he stands scant chance of succeeding to the chairmanship. Reason: Roberts is outranked on the full committee by Harris, John Bell Williams of Mississippi, and Illinois' Peter F. Mack, Jr. If the commerce group under Harris retains the three-subcommittee setup, the chairmanships will be divided among Harris, Williams and Mack.

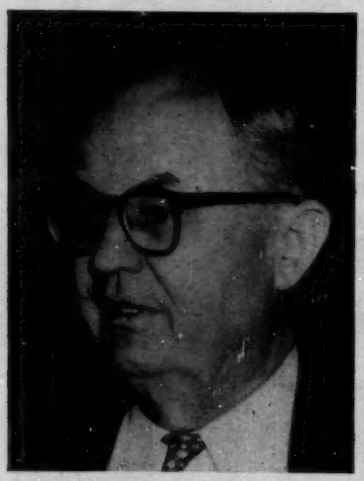
In that case, Harris is likely to keep his chairmanship of the Communications & Transportation subcommittee. This gives him opportunity to make another attempt at enacting the controversial natural gas regulation bill. This would leave the health subgroup chairmanship to the conservative Williams or to Mack, a liberal.

The importance of the health subcommittee to the chemical industry is almost certain to show itself next year, as both industry and the Food & Drug Administration renew their battle over proposals to tighten FDA regulation of chemicals used as food ingredients.

If the new subcommittee chairman can bring about agreement between industry and FDA on the one big point in controversy—whether additives makers can get a jury trial of adverse FDA rulings—there will also be brighter prospects for a related bill imposing similar pretesting requirements on cosmetics.

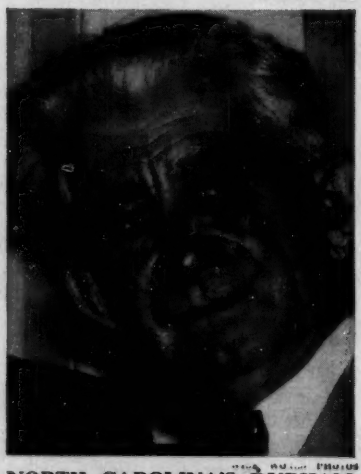
Atomic Angle: The Joint Committee on Atomic Energy, too, will have a new chairman. North Carolina's Carl T. Durham will take over from Sen. Clinton P. Anderson of New Mexico.

This committee may well involve itself in the controversial question of whether the abuilding "fast breeder" atomic power reactor can be safely operated. Hearings on such a matter, originally scheduled by the Atomic



TEXAS' PATMAN: He's first in line to head economic watchdog group.

MISSOURI'S BOLLING: He'll take the job if Patman doesn't want it.



NORTH CAROLINA'S DURHAM: He'll head atomic energy group.

Energy Commission to begin this week *(CW, Oct. 20, p. 25)*, are now slated to start Dec. 10. The public relations problems that this question of safety brings to firms involved in atomic power programs has reputedly caused some firms to decide against an immediate attempt at large-scale development of processes that may later get derogatory publicity.

Trust-Busting Push: One of the big issues that will involve chemical makers concerns the degree of concentration in the chemical field. Here, a familiar face will be back. The special antimonopoly subcommittee headed by Sen. Joseph C. O'Mahoney of Wyoming is already preparing figures on relative concentration of eight industry groups—one of them is the chemical industry.

O'Mahoney's aides are working with the Census Bureau to pull together previously uncorrelated figures, which they hope will show the extent of concentration in chemical manufacture. This report will be carefully studied to see whether there should be hearings into chemical industry concentration.

Credit Credo: The beliefs and general views of Congress on broad economic questions are often crystallized by the Joint Committee on the Economic Report, which has been headed by Sen. Paul Douglas of Illinois. First in line for the chairmanship of this group is Rep. Wright Patman of Texas —who has been an implacable critic of tight credit policies such as those now being practiced by the Administration. He can head the group if he wants it. If not, the chairmanship will go to Rep. Richard Bolling of Missouri, a moderate on money and credit—but a liberal as far as trade and tariff policies are concerned.

But Bolling's influence won't extend too far in considering actual tariff legislation. The committees that will, in '57, take up possible U.S. participation in the Organization for Trade Cooperation, and, in '58, renewal of the Reciprocal Trade Agreements Act are the House Ways & Means Committee, under Tennessee's Jere Cooper, and the Senate Finance Committee, headed by Harry Byrd of Virginia.

Wage Waiver: Moves to extend coverage of the federal minimum wage law to wholesale and retail employees are likely to get bipartisan support in the new Congress, where Southerners —Lister Hill of Alabama in the Senate and the conservative Graham Barden of North Carolina in the House—head the labor committees. Northern Democrats are expected to push for a hike in the minimum wage to $1.25 from today's $1/hr.

Candidate Tally

How did those chemical men seeking election to public office (CW, Nov. 3, p. 22) make out in last week's balloting? Here's how results shape up:

J. Tyler McConnell, executive secretary of Hercules Powder Co., on leave to run for governor of Delaware on the Democratic ticket, was defeated by incumbent J. Caleb Boggs.

R. F. Varney, head of Squibb's biological control department, was edged out by his Democratic opponent in a bid for city councilman of Highland Park, N.J.

James H. Snowden, Du Pont textile fiber market researcher, won by 69 votes in his campaign for election to the Delaware state legislature as a Republican.

Edward Tiller, area supervisor at Du Pont's Newark, N.J. plant, was elected mayor of Garwood, N.J.—the first time in many years that a Republican has won this post.

John P. Davidson, office manager of Du Pont's Newark plant, was elected Republican councilman in Chatham, N.J.

Donald C. Boughten, a senior research scientist in Du Pont's Graselli Chemicals Dept., was defeated by his Republican opponent in a try for the Pennsylvania state legislature.

Henry H. Wolf, Graselli Chemicals Dept. sales control manager, was elected on the Republican ticket to the Delaware state legislature.

Leon Paul Genecki, Republican, of Du Pont's Parlin, N.J., plant, was defeated in his bid for freeholder of Middlesex County.

Harry A. Hook, fire inspector at Merck's Rahway, N.J., plant, was reelected Democratic councilman in Rahway.

Aubrey Pagan of American Potash's Henderson, Nev., plant is the new constable of Henderson Township, but Peter Bartsas, of the same plant, who was running for the state assembly, was defeated by a narrow margin.

• El Paso Natural Gas, faced with diminishing gas supplies for its expanding markets, is acquiring . . .

• Pacific Northwest Pipeline, which has extensive gas reserves—and a pipeline system supplying the Pacific Northwest.

• El Paso, long interested in upgrading its gas by making chemicals, will also get an ammonia plant to add to its other chemical holdings.

• Question now: Will the government approve the merger, allow El Paso to become . . .

The Largest Gas Supplier?

One of the hottest lunchtime subjects of conversation in Washington legal circles last Friday was the proposed merger of Pacific Northwest Pipeline Corp. into El Paso Natural Gas Co., which would make El Paso the largest natural gas company in the world.

What prompted talk are two questions: Will El Paso's acquisition put it under monopoly fire from the U.S. government? Which agency would be behind the gun?

El Paso's acquisition would add some 2.9 trillion cu. ft. of gas to its own reserves of 5.7 trillion cu. ft., would also bring with it a 49% interest in Phillips Pacific Chemical Co.'s 200-tons/day, $15-million anhydrous ammonia plant at Kennewick, Wash. Such an addition, government circles recognize, would give El Paso virtual control over natural gas supplies in many Western states.

El Paso is offering to exchange seven shares of a new, Class B common stock for each eight shares of PNP common. Directors of both firms have approved the plan, but the offer is still subject to the approval of stockholders on both sides. El Paso owners will meet Dec. 21 to vote on the plan (and also on a proposed 2-for-1 stock split). Pacific Northwest owners are expected to receive the offer by the middle of January; approval of 80% would be needed to effect the merger. If El Paso splits its stock, the exchange ratio would then be 14 for 8.

Government Question: Troubling government legal experts is the question of the purpose and method of acquisition. If the combination results in what any government agency thinks would be a monopoly, then a decision must be made as to whether that agency or another would have jurisdiction.

The Clayton Antitrust Act itself is confused on who has primary jurisdiction to act against mergers in regulated industries such as natural gas transport. It can be argued, for example, that if FPC issues certificates of authorization, the action would effectively restrict the Justice Dept. and the Federal Trade Commission from interfering with the deal on their own hook. Experts say, however, that the subject can be argued the other way with almost equal authority.

To complicate things still further, the purpose of the transaction must also be considered. Washington observers figure that since the El Paso deal seems more directly aimed at tying up gas reserves than merely acquiring additional transmission facilities, even if FPC issues a certificate authorizing transfer of pipeline operations, the Justice Dept. or FTC could still challenge the deal.

Whatever the case, both companies will no doubt press the matter to conclusion, for the deal is a good one for both. After putting better than $200 million into its 2,000 miles of pipeline from the Arizona-New Mexico San Juan Basin to the Northwest, Wall Streeters assume that PNP without the merger would have to do some financing to bring operating capital up to working strength. With the merger, El Paso would assume the cash worries.

For El Paso, besides unquestionably fortifying its reserve supplies in the face of an increasing demand, the new facilities would provide it with a quick entry into petrochemicals. In the light of its joint venture with General Tire & Rubber in the manufacture of synthetic rubber, and its more recent decision to join United Carbon Co. in making styrene, part ownership of Pacific Northwest's affiliated anhydrous ammonia unit would give it a logical set up to get into further chemical ventures. Company sources have expressed interest (*CW Business Newsletter, July 21*) in polyvinyl chloride, acrylonitrile, polyethylene and methyl methacrylate, as well as in ammonia and styrene.

New Move for Paper Competition

The Federal Trade Commission, already fighting a handful of antimerger cases in the paper industry, has tackled the world's biggest pulp and paper firm, International Paper, which is making its first move west of the Rockies (CW, Sept. 15, p. 22).

FTC says the company violated U.S. antimerger laws in acquiring Long Bell Lumber Corp., a holding company, and Long Bell Lumber Co., the second largest lumber producer in the Pacific Northwest (*see p. 25*).

FTC charges that International already has paper and paperboard capacity three times as great as that of its largest U.S. competitor, and that it makes from 25 to 50% of many types of paper and paperboard.

As a result of the merger, FTC says, Long Bell abandoned a plan to build a new pulp mill on the West Coast; instead, International will build additional facilities to utilize the timber acquired from Long Bell. When these new mills are completed, FTC charges, International will increase its total U.S. paper and paperboard production by over 15%, its bleached board production 43%, and its newsprint production in the U.S. and Canada 14%.

International's Chairman John H. Hinman defends his company's acquisition as a step to enable it to "compete effectively" in West Coast paper markets. Hinman refers to FTC's other complaints—which claim that competition in the West Coast paper industry is currently inadequate. He sees a contradiction in the new FTC case—on grounds that it would keep a new competitive force out of that area.

Airing Their Problems

As newly elected state and county politicos prepare to take over their offices this week, air pollution continues to rank high on their lists of unfinished business. Stronger regulatory action is proposed in many U.S. communities surveyed by CW.

In Los Angeles, long labeled the nation's most smog-bound city, the Los Angeles County Board of Supervisors has unanimously endorsed stringent industrial controls which it expects will eliminate 500 tons/day of air pollutants from the Los Angeles Basin.

Most important of the new proposals would require degreasing plants, paint and varnish units, and dry cleaning, lithographing and paint-spraying establishments to install pollution control devices. Collectively these devices would eliminate 300-400 tons/day of aerial effluent.

The legislative package—aimed at removing "up to one-seventh of the 3,500 tons of pollutants that enter Los Angeles' air each day"—is the most extensive ever proposed by the county's Air Pollution Control District. Coupled with a further proposal aimed at controlling carbon monoxide emissions from petroleum cracking plants, the program will have gone about as far as it legally can to curb industrial smog emissions.

Besides curtailing hydrocarbon emissions from industries using or making paints or solvents, the proposed regulations would ban single-chamber industrial incinerators after next March 1, and would reduce the maximum flue gas emissions from multiple-chamber incinerators. Other new regulations would require public posting of APCD permits, set up a fee scale (maximum: $500) for plant inspecting plans by APCD, and would add teeth to existing laws requiring new industries to install adequate smog-control devices.

In Columbus, O., efforts are being made to consolidate pollution control activities under a single city agency. Now, the city health department has jurisdiction over odor problems and most other pollution complaints, while activities of the city's smoke control division are rigorously limited to smoke. Chief Smoke Control Engineer Herbert Johnson would like to see a stronger city ordinance against odors, dust and chemicals from local processing plants.

In Ashtabula, O., where pollution from chemical process plants has created a political squabble, a pollution advisory board has been formally organized to study air, steam and smoke pollution problems. The board membership includes a cross-section of parties interested in pollution matters.

In Washoe County, Nevada, the district attorney's office has completed an outline for a smoke control ordinance covering the Reno-Sparks area. The outline will be used in writing a final ordinance. A major problem facing pollution control planners is the legal standing of the Ringlemann smoke density chart, said to be the only known method of determining smoke density.

Another idea that may prove controversial in the Washoe control efforts is a section of the proposed ordinance tentatively designed to prevent additions or alterations to existing fuel-burning plants without inspection by a city inspector. Suggestions have already been raised that the section should apply only to newly built plants rather than including plants already in operation.

Experts commenting on the proposals suggest that legislation should state that violations be made misdemeanors rather than being termed "unlawful." Too, they suggest that the city be empowered to issue restraining orders prior to imposing fines or imprisoning plant officials. In total, the outline includes regulation of smoke density in both private industry and private residences, and regulates construction, sale and use of all smoke-producing heating and fuel-burning units. It also calls for annual inspection of all fuel-burning establishments.

In Phoenix, Ariz., the metropolitan planning committee of the city chamber of commerce is drafting an air pollution control law for Maricopa County under which a control board—comprised of a chemist, a lawyer and a citizen-at-large—would report to a five-man policy board. Financing control activities would be accomplished by imposing a tax up to 2¢ per $100 evaluation in the county, which would provide revenue of about $90,000/year.

In Allegheny County, Pennsylvania, a whole new industry is arising. Several Pittsburgh firms are trying to find markets for fly ash and cinders that have piled up in storage yards throughout the area.

Prime target of the group is to convince highway builders that the refuse materials are as good as other aggregates used with concrete and asphalt. Groups working on the project include the Duquesne Light Co., West Penn Power Co., The Bituminous Coal Research Bureau, and Penn Township. Several experimental roadways are currently in use; there's been considerable experimentation toward using fly ash in making cinder blocks, concrete pipe and precast concrete slabs.

EXPANSION

Nitric Acid: Lion Oil Co. Division of Monsanto Chemical has started construction of a 40-tons/day nitric acid concentrator at El Dorado, Ark. The addition is expected onstream in March '57.

•

Nickel/Copper: Stratmat Ltd., a subsidiary of Strategic Materials Corp., will build a nickel-copper milling plant at Emo, Ont., and a smelter at Fort Frances. The milling plant will have an initial capacity of 2,000 tons/day, will be in operation by mid-'57.

•

Pulp and Paper: Alaska Lumber & Pulp Co., Inc., a Japanese-owned concern, has firmed up plans to build a $50-million, 300-tons/day pulp mill at Sitka, Alaska. The company is negotiating with Dillon, Read & Co., New York investment house, to manage a security sale that will provide a portion of the financing needed.

•

Polyethylene: Dow Chemical of Canada is planning a polyethlene unit at its Sarnia, Ont., works.

•

Cobalt: Howe Sound Co. has started construction of a $750,000 electrolytic cobalt refinery at Garfield, Utah. Capacity: 8,000 lbs./day of high-specification metal.

•

Benzene: Humble Oil & Refining Co. will build a 24-million-gal./year

Washington Angles »

» Does your company make vitamin A? Then you'll be interested in the findings of a forthcoming meeting of vitamin specialists who will recommend a safe maximum dosage of the material for non-prescription sale. The meeting, sponsored by FDA, will be held within two months.

» Proposed federal rules on small stock issues have now come under intramural fire. The Small Business Administration has objected to parts of a regulation proposed by the Securities & Exchange Commission covering new financing that would raise $300,000 or less. SBA completely disapproves an SEC move to exempt a company from having to file detailed information only if it showed a profit in one of the past five years.

But SBA is "more favorably inclined" to an SEC proposal that would, in effect, set a minimum price at which such stock and bonds may be offered to the public. SBA prefers that the minimum be $1 rather than the SEC-proposed $3.

Interested parties may comment by Dec. 5.

» Trade secrets given to government officials on a confidential basis may have to be disclosed to Congressional committees. That's the conclusion some trade association officials have reached, following that investigation of Salk polio vaccine price levels by a Congressional group (CW, Oct. 27, p. 100). Section 105a of Title 5 of the U.S. Code, which deals with congressional rights to information in possession of government agencies, may take precedence over regulations of such agencies as the Food & Drug Administration and National Institutes of Health, which make it illegal for government workers to disclose trade secrets submitted to them in confidence.

Congressional committees are under no restraint against publishing such information.

---

high-purity benzene plant at its Baytown, Tex., refinery. Completion is expected in the latter part of 1957. Adjacent to the plant will be a 40-acre tract of land set aside for future expansion of petrochemical operations.

•

Clay Products: Southwest Industrial Materials Corp. will build an adsorbent-clay processing plant at De Soto, Tex.

COMPANIES

Permanente Cement Co., through its subsidiary, Kaiser Gypsum Co., has bought the physical assets of Fir-Tex Insulating Board, Inc.

•

Cellofilm Industries, Inc., producers of nitro-cellulose base solutions, has been sold by Universal, Paramount and RKO motion picture companies.

•

Block Drug Co. has purchased the capital stock of Maryland Pharmaceutical Co. It will be operated as a Block affiliate.

•

Lanolin Plus, Inc., has purchased State Pharmacal Co.

•

Charters: General Carbon and Chemical Corp., authorized capital stock of 10,000 shares, no par value, at Dover Del.

• Ames Electro-Chemical Corp., authorized capital stock of $84,000, at Dover, Del.

• South Western Chemical, Inc., authorized capital stock of $2,000, at New Iberia, La.

•

Long Bell Lumber Co. of Missouri and Long Bell Lumber Corp. of Maryland stockholders have approved merger of the two firms with International Paper Co.

•

Carborundum Co. has sold $15 million of 4½% notes in a private placement. Funds will help finance a $30-million expansion program planned for 1957 and '58.

•

Reichhold Chemicals, Inc., has agreed with underwriters led by Blyth & Co. to price its initial offering of 200,000 shares of common stock (*CW, Nov. 3, p. 23*) at about $23/share. Original estimates pointed to pricing between $25 and $30.

•

Atlas Mineral Products Co. has been acquired by Electric Storage Battery Co. in exchange for 22,500 shares of Exide Common stock. At current market prices this would amount to about $900,000.

FOREIGN

Fertilizer/Pakistan: Machinery consultants from Japan, France, Italy and the U.S. have expressed interest in bidding on two new fertilizer plants to be set up by the Pakistan Industrial Development Corp. at Multan and Sylhet.

•

TEL/Japan: Two Japanese firms, Toyo Soda Industry Co. and the Daiichi Bussan, will form a jointly owned company to produce tetraethyl lead. Capitalized at $167,000, the new company will be named Ethyl Chemical Industry Co. Japan now imports some $2.8 million worth of TEL each year from the U.S.

•

Fertilizer Trade/Japan-China: Some 22 delegates from the Japanese fertilizer industry are now negotiating in Peiping for the export of Japanese chemical fertilizer to Red China. Represented are producers of ammonium sulfate, calcium cyanamide, urea and ammonium chloride.

•

Synthetic Rubber/Japan: Three Japanese firms are studying a proposal to form a jointly operated company that would make 45,000 tons/year of synthetic rubber by 1962. Sanyo Chemical Co., Mitsubishi Petro-Chemical Co. and Yokohama Rubber Mfg. Co. had each submitted plans for synthetic rubber plants to the Ministry of Trade, but the Ministry expressed doubt that such independent units could be put on a paying basis. If the companies pool their efforts, the Ministry has offered to seek an appropriation for the project.

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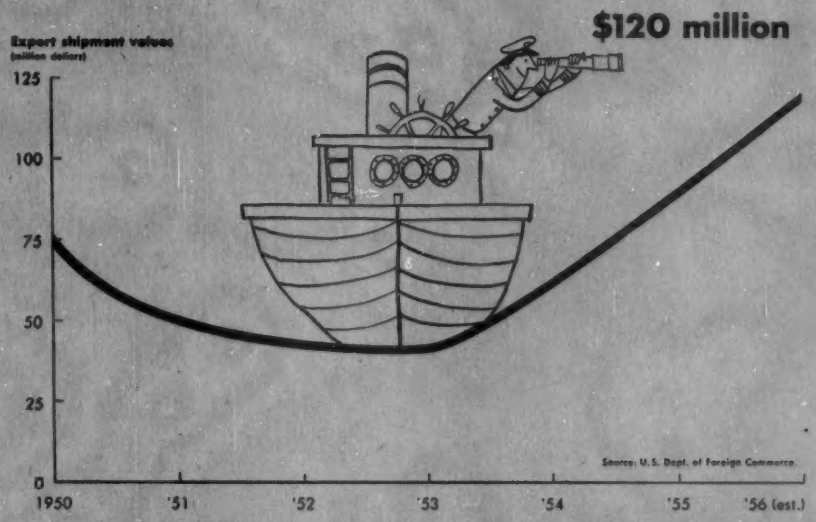
Charting Business

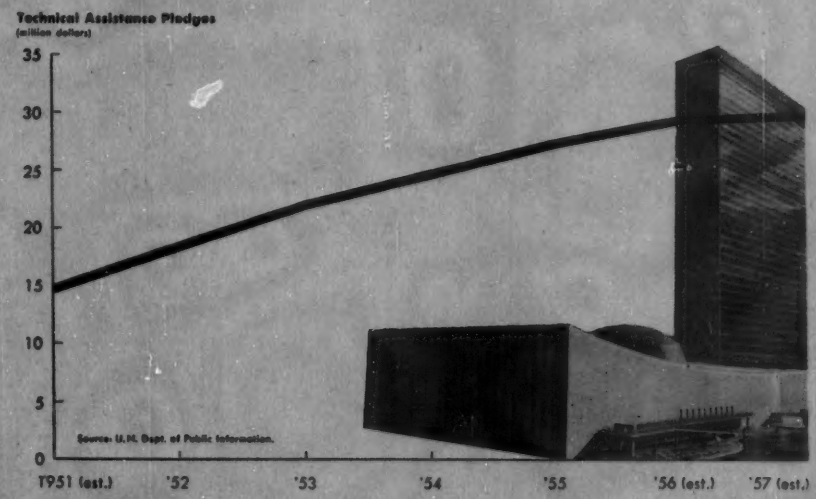
CHEMICAL WEEK
November 17, 1956

NEW CREST IN SIGHT FOR U.S. FERTILIZER EXPORTS:



FERTILIZER exports are surging. Total U.S. shipment values for '56 may end up 33% over '55, hit an all-time high of $120 million. Prime reason: our foreign aid program to the Far East, especially Korea. A continuing U.S. surplus of nitrogen, plus an increased world demand for plant food, will likely accelerate the export trend over the next three to five years. Fertilizer manufacturers here, however, are uneasy over the increased activity of European competitors, who are making some gains in the Far East and in Latin America.

U.N. Supports Development of Technically Backward Countries



LAST MONTH, 65 U.N. member countries pledged $30.3 million toward 1957 operations of the Special Fund for Technical Assistance, $2 million more than the allotment for this year.

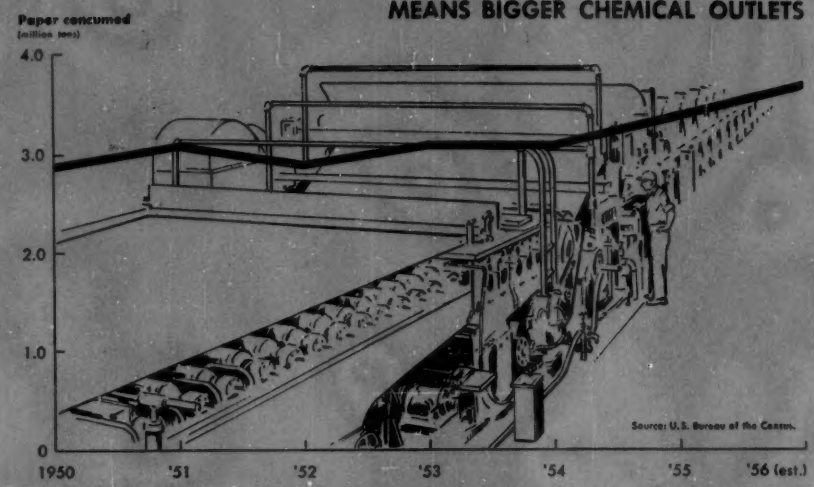
In '55 the largest portions of available cash went into land and water conservation, manufacturing and mining expansion, and vocational and technical training (about 6% each). Other allocations included those for animal husbandry, forest and fish conservation, pesticide control.

Charting Business

(Continued)

SHARP RISE IN PAPER CONSUMPTION . . .

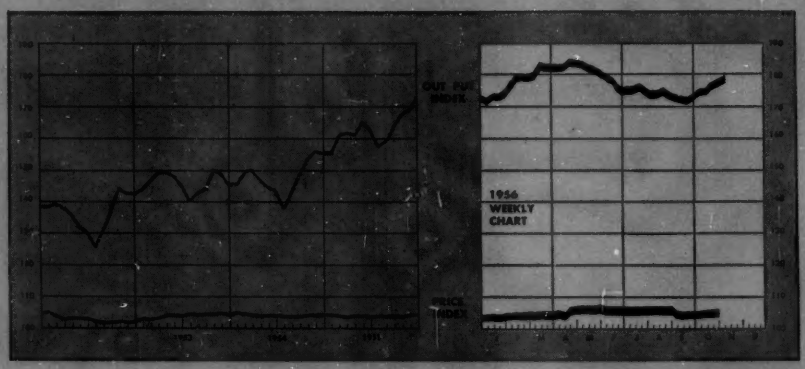
MEANS BIGGER CHEMICAL OUTLETS



PULP and paper production and consumption this year may score new records.

Mills in the U.S. are running about 95% of capacity; annual per capita use of paper is about 420 lbs. Some of the chemicals this $10-billion/year industry will consume in '56 (in thousands of tons): salt cake, 1,000; aluminum sulfate, 550; sulfur, 320; chlorine and caustic, each 275; calcium carbonate, 80; various pigments and dyestuffs, 70; resins, more than 60; smaller quantities of enzymes, sodium aluminate and talc.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	182.6	182.3	168.9
Chemical Week Wholesale Price Index (1947=100)	106.5	106.2	104.7
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	444.6	438.4	486.1

MONTHLY Employment (thousands)	Latest Month	Preceding Month	Year Ago
All Manufacturing	13,387	13,299	13,446
Nondurable goods	5,686	5,732	5,717
Chemicals and Allied Products	554.5	553.1	557.1

That's how much rubber Firestone produced in the last 12 months ...and next year's production will be even greater

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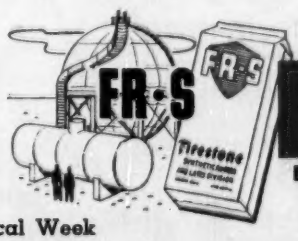

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DEPRECIATION CHARGE-OFFS: AT FIVE-YEAR PEAK

(Annual provision for depreciation, obsolescence and depletion by 20 representative chemical companies—in millions of dollars)

Company	1951	1952	1953	1954	1955
Allied Chemical	$14.9	$15.2	$22.6	$31.6	$46.0
Archer-Daniels-Midland*	2.1	2.6	2.9	2.9	3.4
Celanese Corp.	12.2	12.3	13.4	13.7	14.7
Commercial Solvents	1.6	2.2	2.9	3.4	3.3
Diamond Alkali	3.5	4.0	6.3	7.1	8.9
Dow**	22.4	32.8	52.0	64.5	73.5
Du Pont	83.9	95.3	110.8	112.8	118.5
General Aniline	3.3	3.5	3.9	4.0	4.2
W. R. Grace & Co.	6.0	6.4	7.5	11.5	14.1
Hercules Powder	8.0	7.8	9.1	10.2	12.7
Interchemical Corp.	1.3	1.3	1.2	1.3	1.4
International Minerals*	2.8	3.4	3.9	4.9	6.8
Koppers	4.9	6.4	7.4	7.8	10.2
Merck & Co.	3.1	4.3	7.7	7.8	7.6
Monsanto	12.7	15.7	25.9	30.8	44.7
National Lead	4.9	5.2	6.9	7.2	9.8
Pennsalt	2.4	3.4	3.9	5.0	5.4
Pitt. Coke & Chem.	1.1	1.6	2.1	2.0	2.3
Spencer Chemical	1.7	2.2	2.2	2.7	3.5
Union Carbide	42.9	54.2	75.3	93.7	106.3
20-company totals	235.7	279.8	367.9	424.9	497.3

*Fiscal year ends June 30.
**Fiscal year ends May 31.

Drop-Off Ahead on Rapid Write-off Benefits

Now moving into a tapering-off period leading up to a virtual end in 1960: the temporary benefits—amounting to a total of over $500 million for U.S. chemical companies—under the government's 1951 program of rapid tax amortization to encourage defense-related industrial expansion.

Because these companies have continued to expand mightily even without that extra incentive, it's likely that their total provision for depreciation, obsolescence and depletion will be somewhat higher this year than it was in 1955 (*see table, above*). But there are important bits of evidence that the downturn is close at hand:

• Du Pont's nine-month depreciation-and-obsolescence provision was down by about 5% this year, compared with the corresponding period in 1955. Of the $85.9 million total for the first three quarters of this year, $7.5 million represented amortization under the fast-write-off law; for the first nine months of '55, the figures were $90.7

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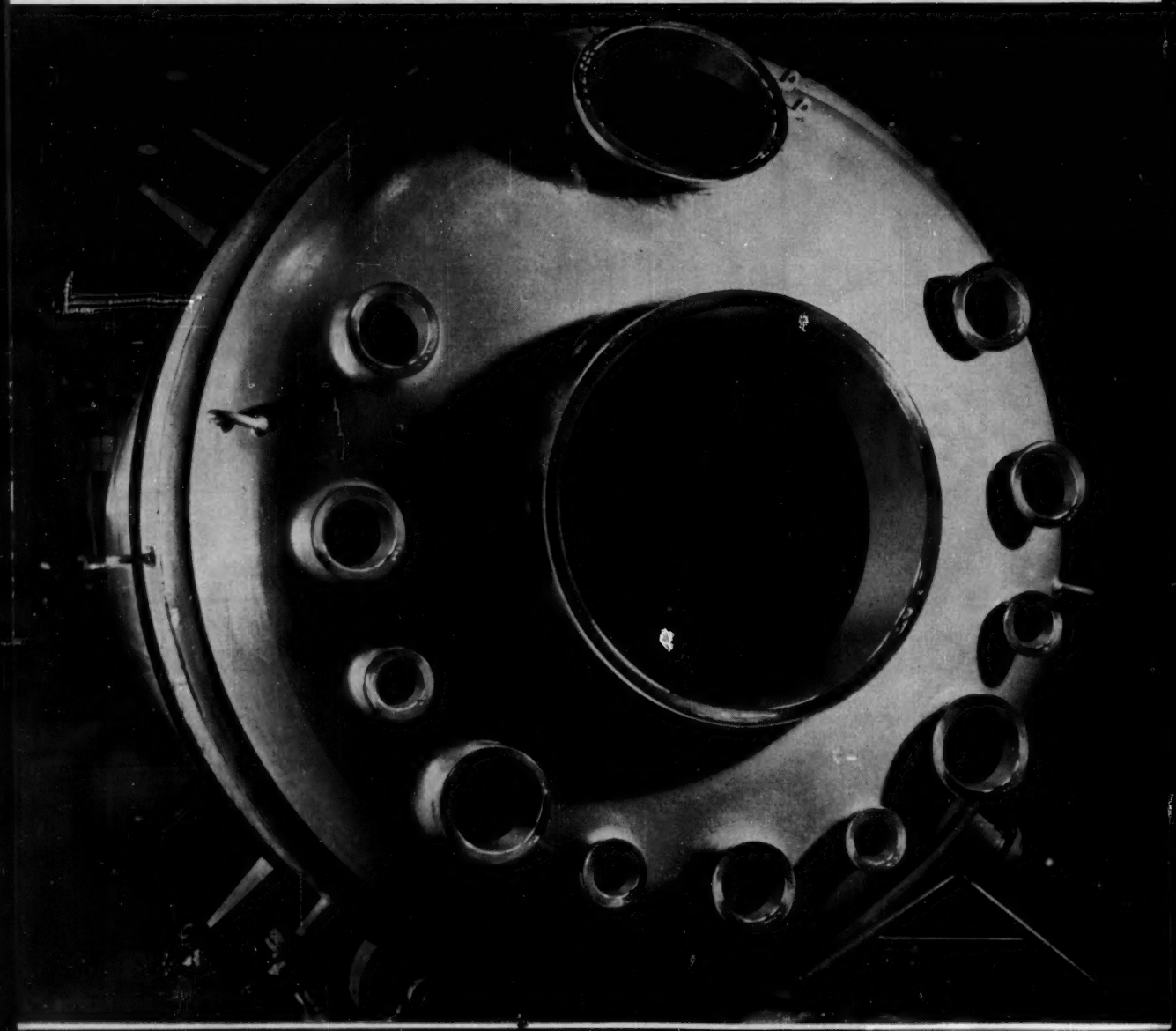

million and $9.6 million, respectively.

• International Minerals & Chemical Corp. (which runs on a June 30 accounting year) reported a $6.6-million provision for this purpose in fiscal 1956, compared with $6.8 million provided in the previous 12-month cycle.

• Dow Chemical's depreciation-and-amortization provision in the year ending last May 31 was less than 1% more than the fiscal 1955 figure, whereas the rise from '54 to '55 was nearly 14%.

Shift in 'Pie Slices': Two effects of the expiration of the fast-write-off era are readily foreseen:

• Retained earnings will be a relatively leaner source of funds for new plants and equipment.

• An increased proportion of earnings will go into taxable income, with consequent prospects for higher tax payments and possibly higher dividend payments.

Such changes in size of various slices of corporate income "pies" obviously will vary radically from one company to another, not only because of differences in company size and in company expansion programs, but also because of differences in methods of bookkeeping and budgeting. At Du Pont, for example, the portion of the cost of "certified" facilities being amortized over five years for tax purposes is being similarly amortized for financial accounting purposes; but at Pittsburgh Coke & Chemical, only normal depreciation on certified facilities is being charged against income. Under the latter system, the excess of tax amortization over normal depreciation is charged against income and credited to "reserve for deferred income taxes," and this money will be taken into income over the remaining useful lives of the facilities after the five-year tax amortization period has ended.

One big variable for all concerns is the possibility of a change in the federal government's tax policy; another is the economic climate governing future expansion; and a third is competitive pressure to modernize and improve production facilities. For the time being, however, it appears that most large and medium-size chemical companies' increased earning capacities will bring in enough income that currently planned expansion will not require an increased share of outside capital.

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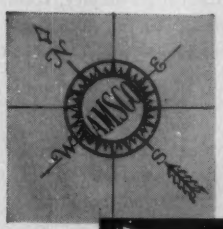

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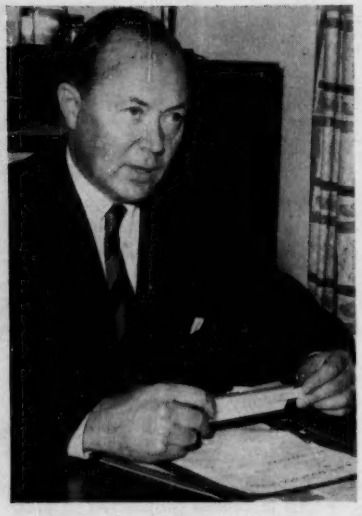

BERNDTSSON, SCHWANBOM: They stress quality and efficiency in . . .

Sweden's Plastics Boom

For U.S. plastics producers, the significance of the boom in the Swedish plastics industry apparent in last fortnight's 10th annual exposition of the Swedish Plastics Federation lies in the industry's determined search for world markets. Forced to export 15% of its 35,000-tons/year resin production* because of a small home market, the young industry is relying on quality and production efficiency to win a larger share of the European market.

These product assets are also the key to the industry's ability to stay entrenched in home markets, a tough job because of the low duty (10%) imposed on resins imported from Britain, France and the U.S. To maintain high quality, some producers assign up to one-fourth of their personnel to research. Licensing of foreign-developed processes is kept to a minimum, and plant equipment is custom-built.

Production Efficiency: Several Swedish plastics makers report a sales value of $20,000 per employee per year—about the level of top U.S. chemical companies. Capital invested per worker is about $16,000, and automation in chemical processing is as operative in Sweden as it is in the U.S.

Summing up Sweden's pitch for efficiency and quality, Technical Director Berndt Berndtsson, of Svenska Oljeslageri Aktiebolaget (Swedish Oil Works Co., Gothenburg), says: "Processors want high quality and . . . consistent quality. This is what Swedish resins have a reputation for."

Common Market Wanted: But regardless of its efficiency and standards, Sweden's plastics industry can expand only as fast as its foreign markets. For this reason, management is heartily in favor of the current proposal for an all-European customs union (*CW, Oct. 27, p. 21*). Explains Technical Director Anders Schwanbom, of Superfosfat Fabriks Aktiebolaget (Superphosphate Mfg. Co., Stockholm): "A common European market would give us a vast outlet based on cheap electric power and an already efficient industry."

For a country with no coal (except 300,000 tons/year of low-grade bituminous), little coke, no oil and no petrochemical industry, Sweden's plastics industry is based, surprisingly, on domestic raw materials—75% overall.

Future Prospects: What will Sweden's plastics production be in five years? One indication is Schwanbom's guess that domestic PVC use, now 7,000 tons/year, will rise 75%.

This much is certain: Swedish plastics production—now about one-fourth of France's and one-third of Italy's—is capable of substantial expansion. But that depends almost entirely on new foreign markets.

*The 'Big-Three' Swedish plastics firm export 30-50% of annual output.

PROBLEM:

STABILIZATION

ANSWER:

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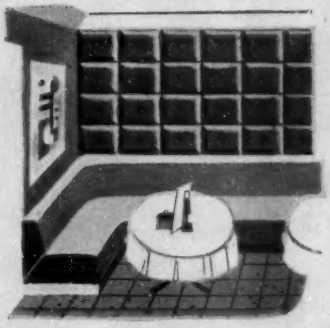
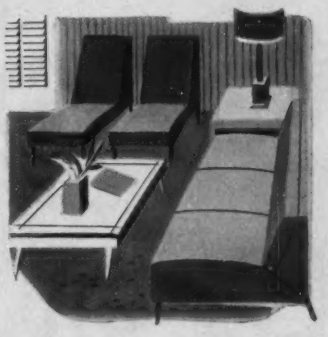


EXAMPLE:

The Nuostabes as stabilizers for vinyl resins



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Nuodex Additives are chemical compounds designed to serve many industries in many ways. Behind them is a policy of continuous research. Available to you is cooperative research, without obligation, on any problem within our wide scope. For an old or a new formula, if you feel that your product is "just one step short of perfection," we will be happy to discuss it with you. We may already have the answer.

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has the facts on DIAMOND'S custom production of chlorinated derivatives. Call him in and talk it over.

Diamond

makes the following chlorinated products at Newark, N. J. We ship promptly.

Chloral
2, 4-Dichlorophenol
2, 4, 5-Trichlorophenol
2, 4, 6-Trichlorophenol
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More Diamond products:

carbon tetrachloride; perchlorethylene; methylene chloride; methyl chloride; chloroform; Chlorowax® (chlorinated paraffin); muriatic acid; DDT; BHC, 15% and 40% gamma; Lindane; 2,4-D and 2,4,5-T amine salts, esters and formulations; grain fumigants.

Like more information

or technical help? Phone your DIAMOND man. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals

UP FOR REVIEW: WAGE RATES ON U.S. CONTRACTS

(Minimum wage rates now in effect in chemical process industries under Walsh-Healey public contracts law)

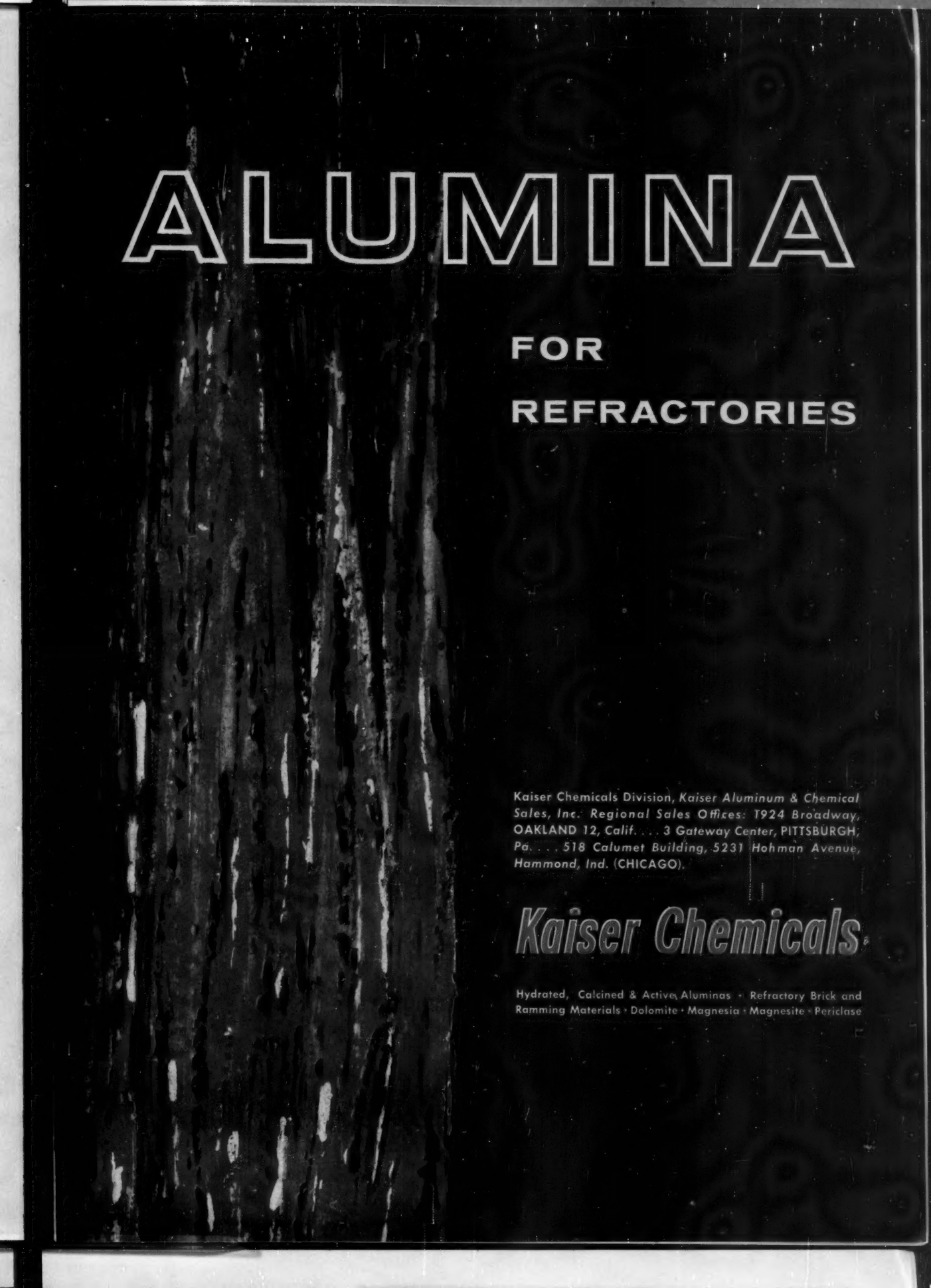
Branch of Industry	Date of Determination	Minimum Hourly Rate	States Included
Industrial and refined basic chemical products	Oct. 7, '56	$1.00	Ala., Ark., D.C., Ga., Fla., Md., Miss., N.C., S.C., Tenn., Va.
	Jan. 23, '51	1.15	All other states
Drug, medicinal and toilet preparations and cosmetics	Oct. 7, '56	1.00	Industry-wide
Fertilizers	Oct. 7, '56	1.00	Industry-wide
Fireworks	Oct. 7, '56	1.00	Industry-wide
Paint and varnish	Oct. 7, '56	1.00	Ala., Ark., Fla., Ga., La., Miss., N.C., Okla., S.C., Tenn., Texas, Va.
	Feb. 17, '52	1.05	All other states
Soap and detergents	Oct. 7, '56	1.00	Industry-wide
Pulp and paper products, except paper bags	Dec. 5, '55	1.15	Industry-wide
Paper bags	Oct. 7, '56	1.00	Industry-wide
Photographic and blueprinting supplies and equipment	May 7, '56	1.18	Industry-wide
Explosives	April 20, '52	1.20	Industry-wide
Cleaning and polishing preparations, insecticides, fungicides and miscellaneous chemicals	Oct. 7, '56	1.00	Industry-wide
Bone black, carbon black, and lamp black	Jan. 23, '51	1.40	Industry-wide
Blasting and detonating caps	Apr. 20, '52	1.12	Industry-wide

Wage Wheels Start to Turn

Ponderous governmental machinery has been cranked up, and the probable result — eventually — will be higher minimum wage rates for major employers in several branches of the chemical process industries.

The U.S. Labor Dept.'s Wage-Hour and Public Contracts Division has asked the Bureau of Labor Statistics —a sister agency in the department— to mail out questionnaires to all firms with 10 or more employees in these classifications: drugs and medicines, soaps and detergents, and paint and varnish. In addition, officials already have corresponding wage data for plants making industrial chemicals, and will soon decide whether to start a Walsh-Healey wage determination proceeding for that category.

One point to note: while making an industry survey for Walsh-Healey purposes is a pretty good tip-off that redetermination will eventually be forthcoming, the law leaves final action up to the Secretary's discretion. He can call a halt to the proceeding at any stage, even after a proposed wage determination has been published for comment by all parties. And it may take anywhere from months to years to go through all the steps.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REFRACTORIES
Kaiser Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH, Pa. . . . 518 Calumet Building, 5231 Hohman Avenue, Hammond, Ind. (CHICAGO).
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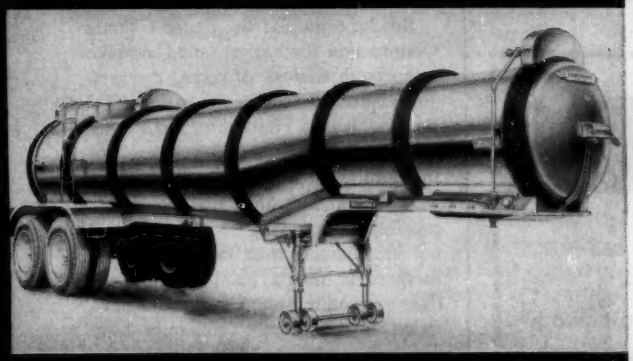
Hydrated, Calcined & Active Aluminas • Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Periclase

New TRAILMOBILE acid

The secret is exterior ring design!

tank trailer...



has THOUSANDS of POUNDS more payload capacity

The new Trailmobile Model CH Acid Tank Trailer gives you big, extra payload capacity amounting to as much as 100 pounds for every 100 gallons of capacity built into the tank.

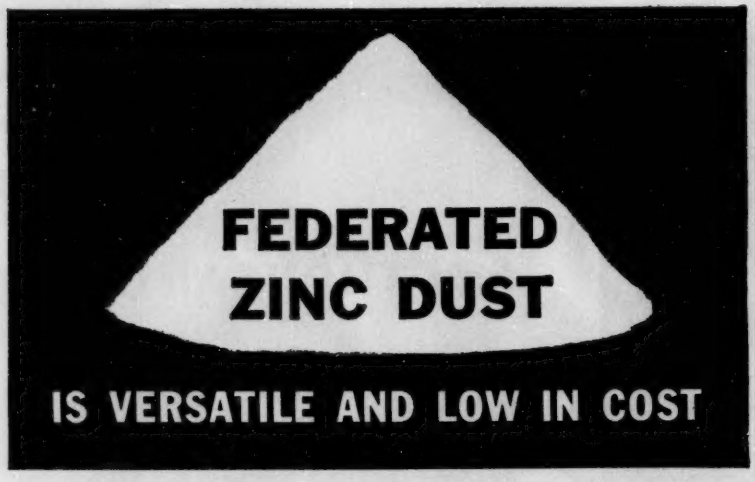
The secret is exterior ring design! Brawny rings of steel reinforce the new light gauge shell allowed by regulation codes. This unique design lightens the trailer by thousands of pounds while retaining structural strength.

This new Trailmobile Model CH incorporates every money-saving feature of previous Trailmobile models. It is available in high tensile steel, stainless steel or aluminum with a variety of coatings and linings to handle all types of corrosive and non-corrosive fluids. Insulated models are also available where load temperatures need to be maintained.

Check on the CH before you buy. TR-478

TRAILMOBILE INC.

Cincinnati 9, Ohio • Springfield, Missouri
Longview, Texas • Berkeley 10, California



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Federated zinc dust is characterized by uniform purity (97 percent metallic zinc); and by fineness (all will pass through a 100-mesh screen; 97% through a 325-mesh screen).

Our complete research and engineering assistance is available to help you find applications for this plentiful, inexpensive product; or to aid you in present application problems. If you want to experiment in the use of zinc dust, we'll be pleased to send you a free half-pint sample. Just fill in the coupon below.

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ADMINISTRATION

Pound of Prevention

For merger-minded management in the chemical process industries, two points—generally agreed on by the more than 600 business delegates attending—stand out from last fortnight's American Management Assn. special conference on mergers and acquisitions:

• The current wave of mergers will not affect the U.S. economy so drastically as some people have been predicting.

• Nevertheless, there's going to be much greater governmental attention than ever before to mergers, with increasing emphasis on early action to prevent acquisitions that are deemed monopolistic, rather than waiting until a merger is consummated and then seeking a court order for dissolution.

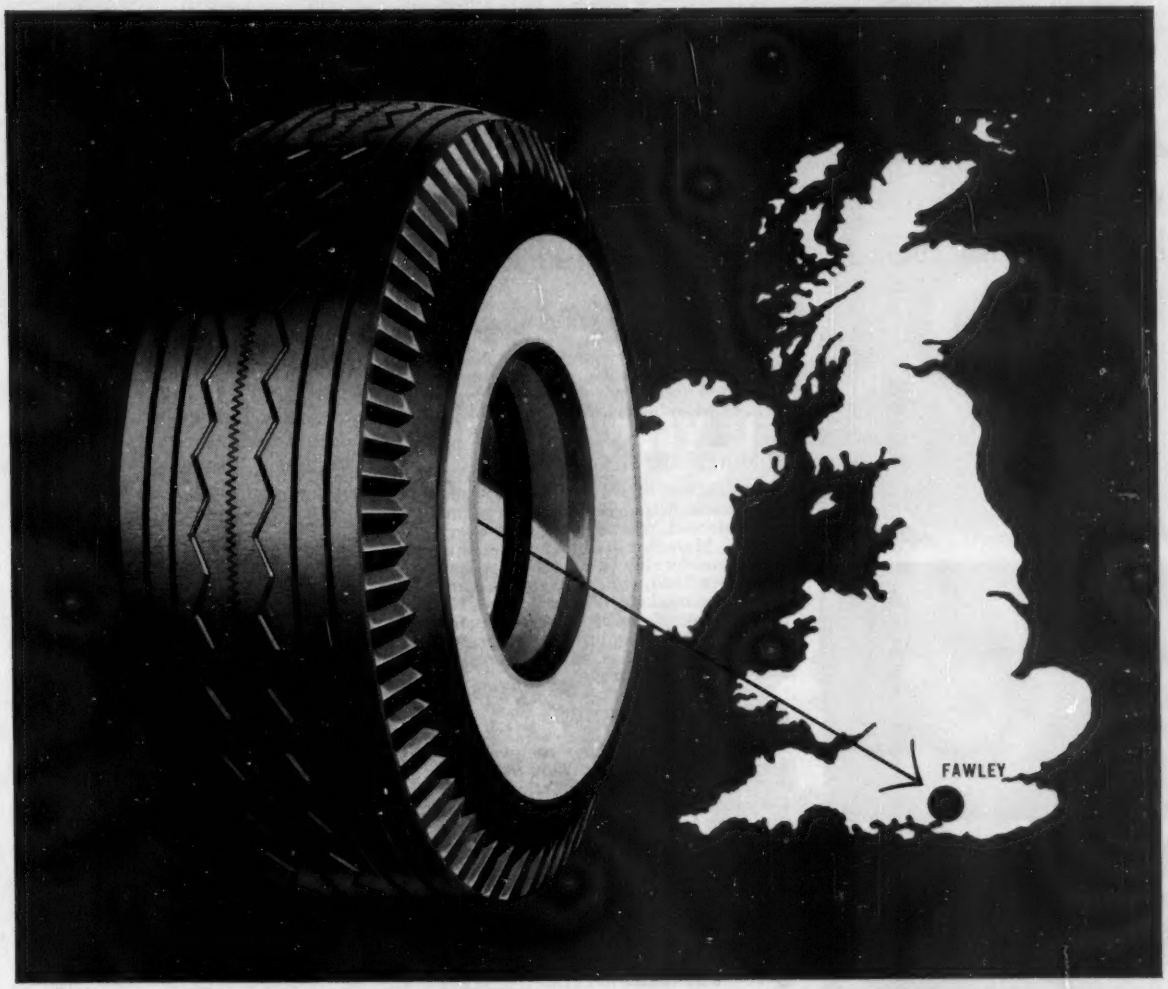
Examined by the 15 speakers from industry, finance, government and education—including Monsanto Chemical's Personnel Practices Manager John Hawn and Personnel Relations Director Lyle Fisher of Minnesota Mining & Mfg.—were numerous aspects of corporate merging: establishing acquisition policy, evaluation of advantages and assets, taxes and financing, and integration of operations and personnel.

Merger Totals 'Meaningless': So far, according to Economics Professor M. A. Adelman of Massachusetts Institute of Technology, scattered evidence seems to indicate that the total amount of assets involved in mergers during the past few years has been too small to have any large effect on the structure of business generally.

But he criticized the Federal Trade Commission for having failed to make a thorough analysis of recent mergers, and expressed astonishment that FTC should "instead chase after even more elaborate and meaningless totals of the number of mergers."

Adelman said that mergers "may possibly be growing in importance," but maintained that the number of mergers is not a good measure of their economic importance. And inasmuch as the largest companies have not been combining among themselves, he added, there can have been no great changes in the structure of many industries and markets.

Stiffer Enforcement Seen: Of particular interest to many of the execu-



another Blaw-Knox **FIRST** *in the Rubber-Resins-Plastics field*

The contract recently awarded Blaw-Knox Company by The International Synthetic Rubber Company, Ltd.,* will be another significant achievement for Blaw-Knox . . . design and construction of the first synthetic rubber plant in Great Britain, at Fawley, England.

This and scores of other rubber, resins and plastics projects . . . both large and small . . . have provided Blaw-Knox the technical skill and practical experience needed to best handle *your* next project . . . from preliminary planning through initial operation and training of personnel. We'd like to discuss *your* plans . . . for a single unit or a complete plant.

Over the years, Blaw-Knox Company has made many important contributions to this industry. For example:

1936–First Dowtherm-heated and cooled Alkyd-Resin Kettle . . . for Devoe & Raynolds Company

1941–First plants to produce GR-S Rubber in the United States . . . for Firestone Tire & Rubber Co. and U. S. Rubber Co.

1951–First Radiant Heated Resin Kettle . . . for Pratt & Lambert, Inc.

*Principal shareholders are: Dunlop Rubber Company, Ltd.; The Goodyear Tyre & Rubber Co. (Great Britain), Ltd.; The Firestone Tyre & Rubber Co.; Michelin Tyre Co., Ltd.

50th Anniversary BLAW-KNOX 1906-1956

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Birmingham, New York, Philadelphia, San Francisco, Washington, D. C.

HAVEG® News

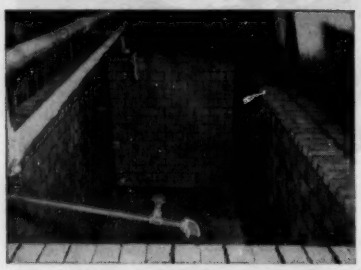
Wherever CORROSION RESISTANCE is a Factor

HAVEG PLASTICS SOLVE A MILLION CORROSION PROBLEMS

Haveg materials developed from special synthetic resins reinforced with selected chemically inert agents provide rugged strength and durability—plus exceptional resistance to corrosive chemicals and atmosphere—for a vast variety of industrial equipment.

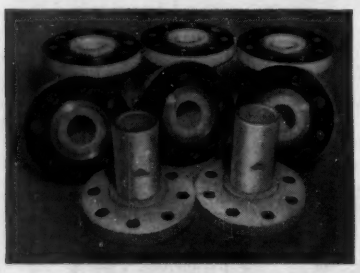
PROCESS AND STORAGE TANKS

New lightweight polyester glass tanks now augment the complete Haveg line of reinforced plastic tanks for every service. Manufactured and installed at costs considerably below those for lead or rubber-lined, stainless, and in some cases even mild steel constructions, the new polyester tanks offer additional saving in minimum steel requirements for support, ease of installation and maintenance-free service.



FUME REMOVAL SYSTEMS

A complete Haveg fume removal system consisting of corrosion resistant duct, hoods, stacks and fittings offers the most efficient and economical installation for handling corrosive fumes and gases at atmospheres up to 350°F. Units are readily fabricated to accommodate the most intricate system layout and are available individually to replace deteriorated apparatus in existing systems.



CORROSION RESISTANT PLASTIC CEMENTS

Haveg resin cements in a range of formulations to meet every chemical resistance requirement are readily prepared and worked for brick lining of process tanks, laying of chemical brick and tile floors, etc. Haveg cements are ready for use within 24 hours!

NOW—TEFLON*

with all its superlative qualities has been added to the growing list of materials used by Haveg to manufacture corrosion resistant equipment.

It is now carried in stock as tubing, pipe and rod. Production now starting on "TEFLON" lined steel pipe, fittings, and vessels.

*"TEFLON"—*du Pont trade name for Tetrafluoroethylene resin.*

Whatever your corrosion problem, Haveg research has developed the plastic to solve it at low cost. Haveg engineers are prepared to assist you in selecting the Haveg equipment to meet your requirements or to custom design and engineer your process installations to assure you full advantage of Haveg's low cost production methods. Discuss your operations with a qualified Haveg representative . . . or write for Haveg Bulletin C-14 at no obligation. H-505

HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY

HAVEG INDUSTRIES, INC. 920 Greenbank Road, Wilmington 8, Delaware
Factory: Marshallton, Del. phone WYman 8-2271

Atlanta	Chicago	Cleveland	Detroit	Houston	Los Angeles	New York	Seattle	Denver
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tives attending the three-day meeting in New York's Hotel Roosevelt were the Thursday and Friday luncheon addresses by two of the government's principal enforcement officers in the field of mergers: John Gwynne, chairman of FTC, and Robert Bicks of the Justice Dept.'s Antitrust Division. Both outlined plans for more vigilant patrolling of mergers and acquisitions.

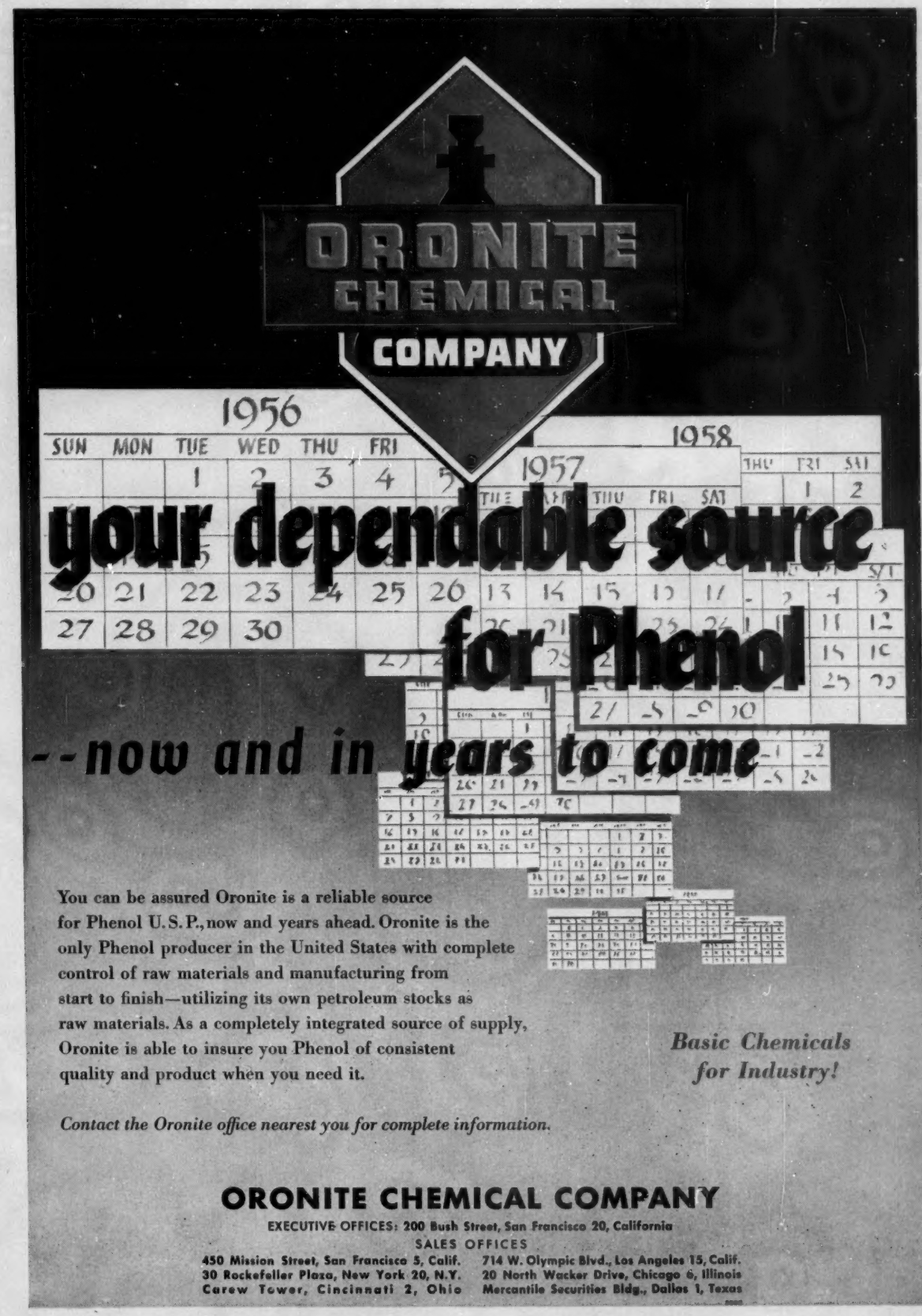
Gwynne asked that Congress give his agency injunctive powers against proposed mergers tending toward monopoly, adding that FTC's definition of that phrase varies from one industry to another. Bicks contrasted the Clayton Act with the earlier Sherman Antitrust Act, noting that the Clayton act—as amended—was designed to deal with mergers "in their incipiency, before they become full blown." He said 23 actions have been initiated under the Clayton Act's "antimerger" section—eight by Justice, 15 by FTC. Both men favor a premerger notification law, which Bicks said would make it possible to stop a defective merger before it is finalized.

The number of management men attending the conference and the content of the speeches point up a fact already well known to chemical executives: that merging has become an important and intricate branch of managerial science. Recognizing this, AMA is planning a series of workshop seminars for more detailed study of merger policies and problems.

FOR STIFFER ENFORCEMENT

What FTC and Justice Dept. are asking for in their move to step up enforcement of 'merger laws.'

- **Advance notification of mergers (probably 90 days).**
- **Injunctive powers for FTC, similar to those now held by the Justice Dept.**
- **More money—already partly granted by a substantially increased Congressional appropriation — for larger enforcement staffs.**



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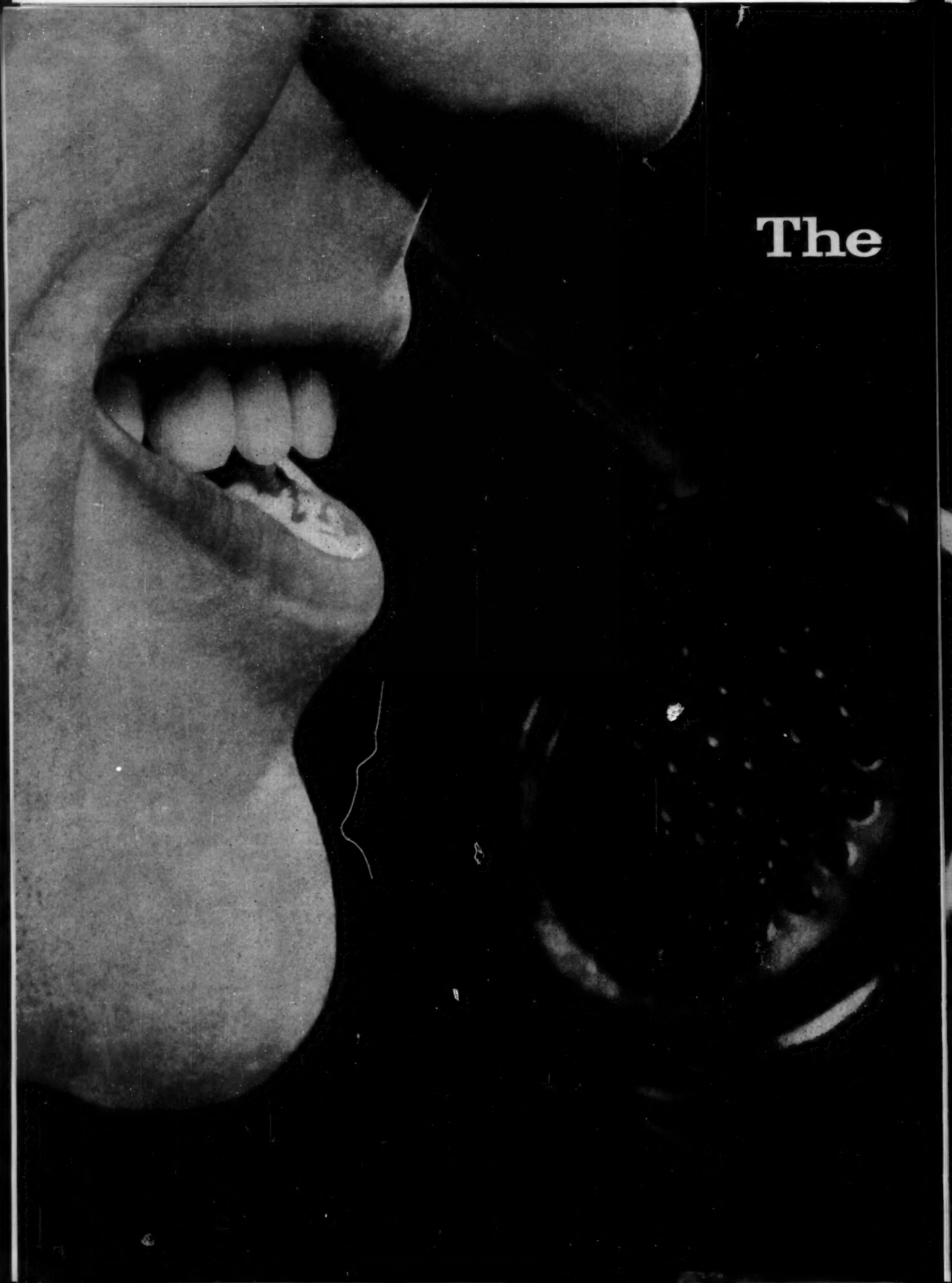
The

Man from St. Regis says:

"It's an amazing new concept in packaging...the FLUOPACKER FILLING MACHINE"

Available in 1 to 4-tube models, the Fluopacker Filling Machine packs powdery and granular materials alike at high speeds, with accurate weights, into smaller, cleaner bags.

The secret is Fluidizing . . . an exclusive process that sends low pressure air (1-3 psi) through a canvas air pad to the bottom of the supply bin. Once material is "fluidized" it flows out through filling tube due to the difference in "pressure head" between bin and bag.

Here are some of the ways that the Fluopacker Filling Machine gives you easier, more economical packaging:

EASIER, FASTER OPERATION AND HANDLING . . . automatic controls fill up to 20 bags a minute . . . bags are easier to handle, palletize and transport—help you make more efficient use of warehouse.

BAG COST SAVINGS . . . Aeration of the product by *fluidizing* actually is less than by conventional filling methods—results in denser product, smaller bag sizes.

DUST-FREE OPERATION . . . Dust leakage around the filling tube is prevented by use of an expandable rubber seal between the valve of the bag and filling tube . . . danger of toxic or silicosis hazards are minimized.

Four-tube Fluopacker Filling Machine at G. & W. H. Corson's Plymouth Meeting, Pa. plant accurately weighs and packs 50-pound valve bags at rates up to 18 per minute. Corson reports "the Fluopacker Filling Machine enables us to cut bag size the equivalent of three inches in length, gives us a better package and saves money!"

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Behind the Man from St. Regis stand experts in every field of packaging, ready to serve you.

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Please send me free illustrated booklet on the Fluopacker Filling Machine.

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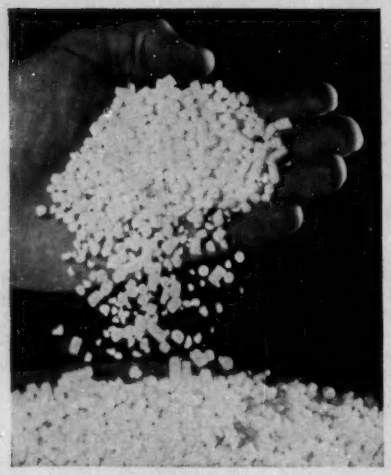

Flows freely after months of storage!

DU PONT

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SODIUM NITRITE

One order will show you that Du Pont's new *pelletized* form of sodium nitrite puts an end to all caking problems. These cylindrical pellets resist moisture pickup and remain free-flowing even after months of storage—*and they're not contaminated by any anti-caking agents.*

Easier handling is only part of the story. You can save on storage space, too, because the bulk density of pelletized sodium nitrite is about 15% higher than that of the granular form. So contact the jobber or sales office nearest you and your order will be on its way.

This handy booklet contains full details on stock points, availability, storage, and toxicity. For your copy write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT

SODIUM NITRITE

DU PONT

Better Things for Better Living . . . *through Chemistry*

ADMINISTRATION

LEGAL

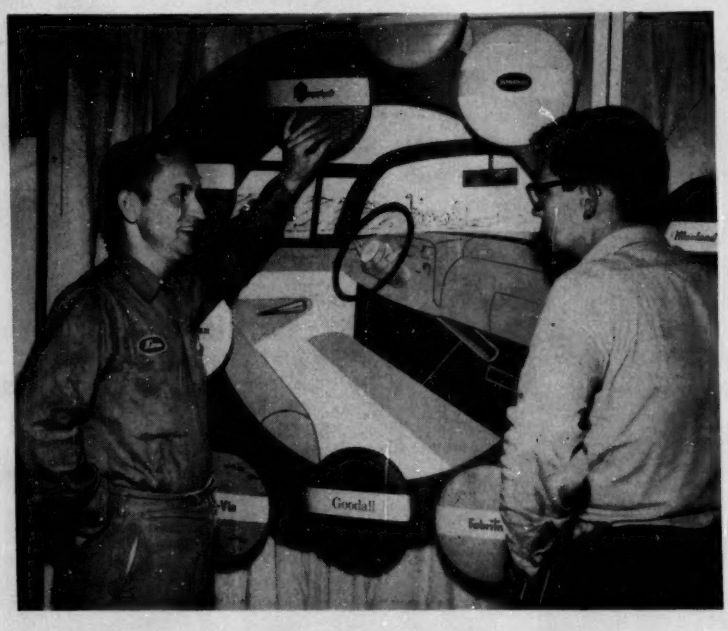
Pfizer Sues in Cuba: Chas. Pfizer & Co. (Brooklyn, N.Y.), has asked civil court in Havana, Cuba, to issue an injunction to prohibit unlicensed sale and distribution of tetracycline by Ganfersa, S.A.—drug distributor in Cuba for Lepetit, S.p.A. (Milan, Italy), which Pfizer says has been manufacturing the antibiotic.

Pfizer reports it has two Cuban patents on tetracycline—trade name Tetracyn—one of which contains process claims covering production of the drug by direct fermentation. Patent 15,168—which Pfizer says has been violated—contains product claims covering the manufacture, use or sale of the drug, regardless of the method of production or type of formulation. Pfizer's basic product patent for tetracycline (U.S. 2,699,054) was granted in Jan. '55.

Continental Can-Gair Merger: Hard on the heels of last month's government suit designed to block Continental Can's (New York) merger with Hazel-Atlas Glass Co. (Wheeling, W. Va.) comes a similar suit (*CW Business Newsletter, Nov. 3*) aimed at nullifying Continental's merger with Robert Gair Co. (New York).

The suit—alleging violation of the antimerger clause of the Clayton Act, and requesting the court to order Continental to divest itself of stock and/or assets of Robert Gair—is the latest example of the government's announced policy of vigilance toward corporate mergers allegedly tending toward monopoly (*see p. 40*).

Continental Can—according to the complaint filed in federal district court in New York—is one of the leading U.S. manufacturers and distributors of containers, packaging materials and related products. Robert Gair, the



For Better-Informed Employees

TO BETTER ACQUAINT plant personnel with end-uses of their handiwork, Emery Industries, Inc. (Cincinnati) is conducting a series of 20-minute employee meetings. Workers are told how vinyl plasticizers are used in coated fabrics, sheeting and film, and how they contribute to appearance and wearability of automobiles, furniture and luggage. Chief feature of the meetings—part of a broad educational program to increase employee pride in the company and its products—is a display (*above*) used at the recent plastics show.

Another client benefits from a Badger "Precious Plus"

An Achievement of Creative Engineering:

STYRENE FROM GASOLINE!

Sketch shows Cosden Petroleum's new ultra-fractionation and styrene manufacturing plant as it will appear when completed in early 1957. The four columns — each almost 200 feet high —will be among the tallest ever erected!

The plant that "couldn't be built" now under construction

At Cosden's Big Spring, Texas, refinery, Badger is erecting the first plant ever designed for the recovery of ethyl benzene by distillation. The process *first* became commercially practical when Badger Engineers developed Ultra-fractionation.

Now, instead of marketing catalytic reformer effluents as mixed solvents, this new distillation process will make it possible for the client to produce a pure product with a far higher profit margin.

This achievement in *Creative Engineering**, like all intangibles, can never be shown on the blueprints. Yet it is the "Precious Plus" in Badger's performance that is making Cosden's plant possible!

Other leading companies, too, find Badger's *plus* in performance of precious advantage — whether their need is design, engineering or construction. How else explain the unusual growth Badger is enjoying?

+ You need new "yardsticks" to measure the plus performance of Badger. For the abilities of this dynamic organization go far beyond what can be shown on blueprints—and it's such intangibles that add up to better processes and plants, faster and at lower cost.

***Creative engineering . . .** whether your process problem is common or complex, Badger engineers solve it with fresh thinking that frequently produces new efficiencies, unexpected savings.

Broad experience . . . Badger Engineers are more than competent—most staff members are recognized authorities in their fields.

Key Man operation . . . the Badger man who submits your proposal is always a principal—always the Key Man responsible for the execution of your job. Clients say, "This is the Badger difference that makes the difference."

BMC

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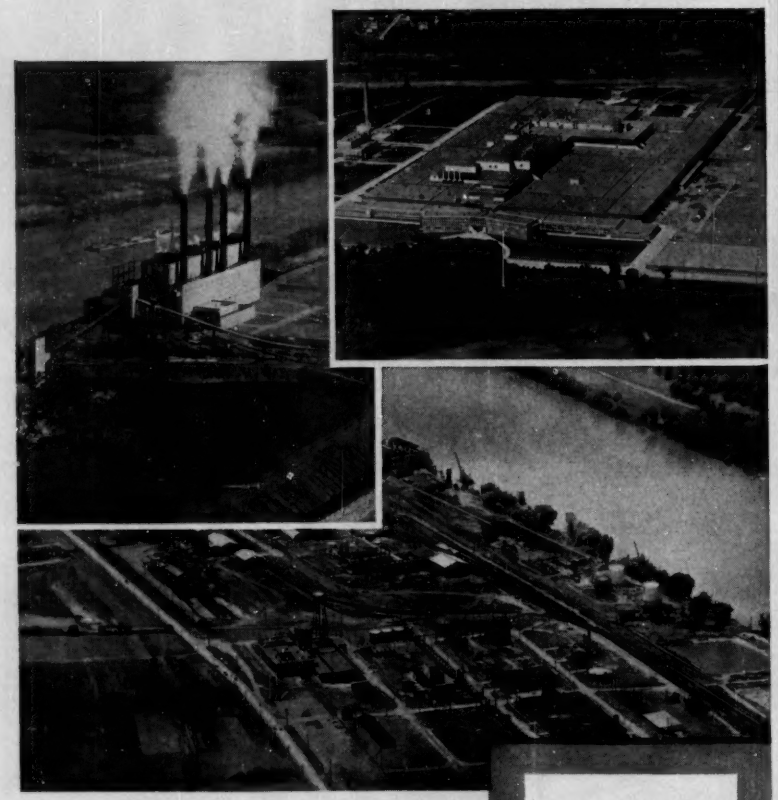
ENGINEERS CONTRACTORS DESIGNERS MANUFACTURERS

They Looked....and Located

In B&O's LAND of BIG OPPORTUNITY



● *A new or expanded plant every 30 hours during the last 15 years!* That's the remarkable record of industry's confidence in B&O's Land of Big Opportunity. The reasons are clear. *This area* is the nation's *top market*, embracing about *half* its population—that means workers and customers. Natural advantages plus continual power-growth and availability of special raw materials provide a production-right scene for modern industrial operations.

B&O's *plant-location experience* assures industry executives *realistic* counsel on site selection. *Look where a site is production-right* . . . let B&O show you *on the ground*, or at your desk using modern airviews plus 3-dimensional color.

THERE'S A PRODUCTION-RIGHT SITE FOR YOU TOO!
Ask our man!

the B&O

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PITTSBURGH 22	Phone:	COurt 1-6220
CINCINNATI 2	Phone:	DUnbar 1-2900
CHICAGO 7	Phone:	WAbash 2-2211

THIS SPECIAL STUDY ON REQUEST
From the B&O Railroad, Baltimore 1, Md.

BALTIMORE & OHIO RAILROAD

Constantly *doing things* —better!

ADMINISTRATION

PROSECUTOR RANKIN: A serious challenge to Congressional intent.

government alleges, has been a major manufacturer and distributor of paperboard, paper containers and flexible paper packaging products. The government charges that in the manufacture, use and sale of several of the Gair products, Continental is a direct competitor.

Acting Attorney General J. Lee Rankin, commenting on both Continental mergers, said: "These mergers appear to seriously challenge the reported intent of Congress in enacting a law that would prohibit horizontal, vertical and conglomerate acquisitions where the effect may be substantially to lessen competition."

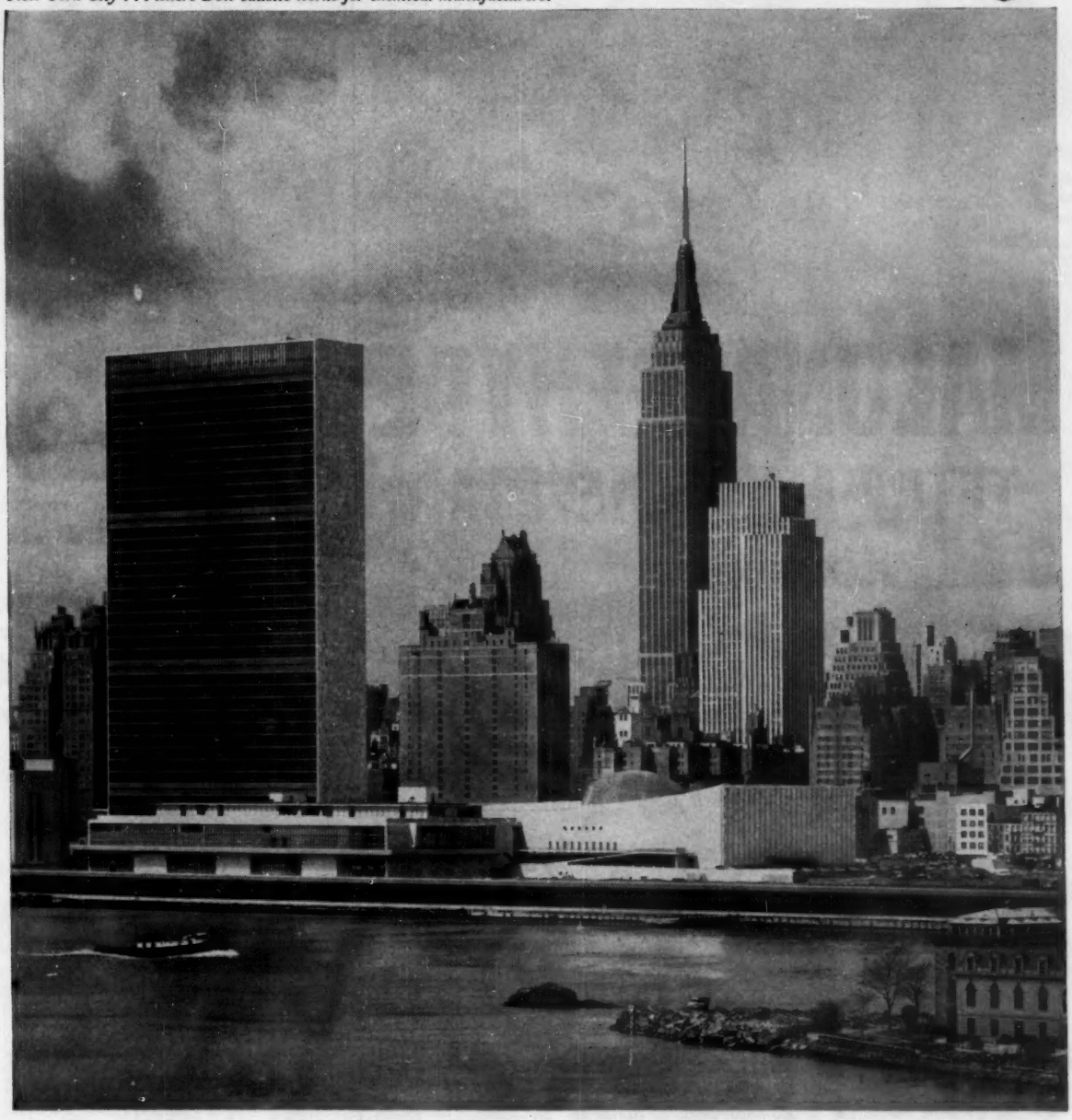
LABOR

Payroll Totals Climb: Employment and earnings are mounting simultaneously in the chemical process industries. Latest figures from the U.S. Labor Dept.'s Bureau of Labor Statistics show that the number of persons employed in the manufacture of chemicals and allied products rose to 838,900 in September—a gain of 2,600 from the previous month and up by 20,100 during the preceding 12 months. Average hourly earnings were $2.13 as of mid-September, up 10¢ from September '55; and average weekly earnings have moved up by more than $4 over the 12-month period to $88.40.

And in a special study, the government agency calculates that 62.6%

New York City . . . where Dow caustic works for chemical manufacturers.

DOW



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Continual Dow *research* on processing that involves caustic now . . . or will years from now . . . develops ways for you to do it better, faster, at decreased cost. This creatively practical planning helps you to improved, more uniform products to sell profitably in new markets.

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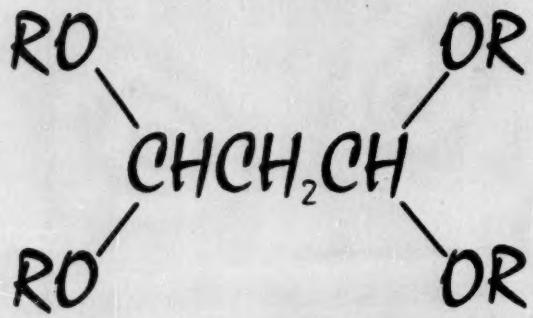
TETRA-ALKYL DIACETAL
(TETRA-ALKOXY PROPANE)



suggestions cross-linking agent; insolubilizing agent; substituted pyrimidine building block; usual dialdehyde reactions; pyrazole intermediate

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TOMPKINS: In long-term contract, employees get option on openings.

of all production and maintenance workers in the chemicals and allied products field were earning an average of $2/hour or more as of mid-August. This compares with a figure of 48.5% for this same industrial classification one year earlier. For manufacturing industries as a whole, 51.7% of workers earned $2/hour or more last August, 42.6% in August '55.

•

Optional Openers: Under President Gerald Tompkins, American Viscose Corp. is doing some pioneering in employee relations. Last June, Avisco entered into a three-year contract covering hourly paid employees at seven plants, granting the equivalent of an 11¢/hour pay rise (through company payment of all pension costs) immediately and an additional 4% increase to become effective next June. Now, at its plant in Fredericksburg, Va., the company has given Textile Workers Union (AFL-CIO) a long-term pact with immediate and 1957 cash benefits, more liberal pension and insurance clauses, plus alternative reopening terms to be chosen by the employees. Members of the TWU local at Fredericksburg are to decide at an early meeting whether they want to begin new wage negotiations April 1, '59, and general contract renewal talks Feb. 1, '60, or to take up both wage rates and all other contractual matters on an intermediate date, Aug. 1, '59.

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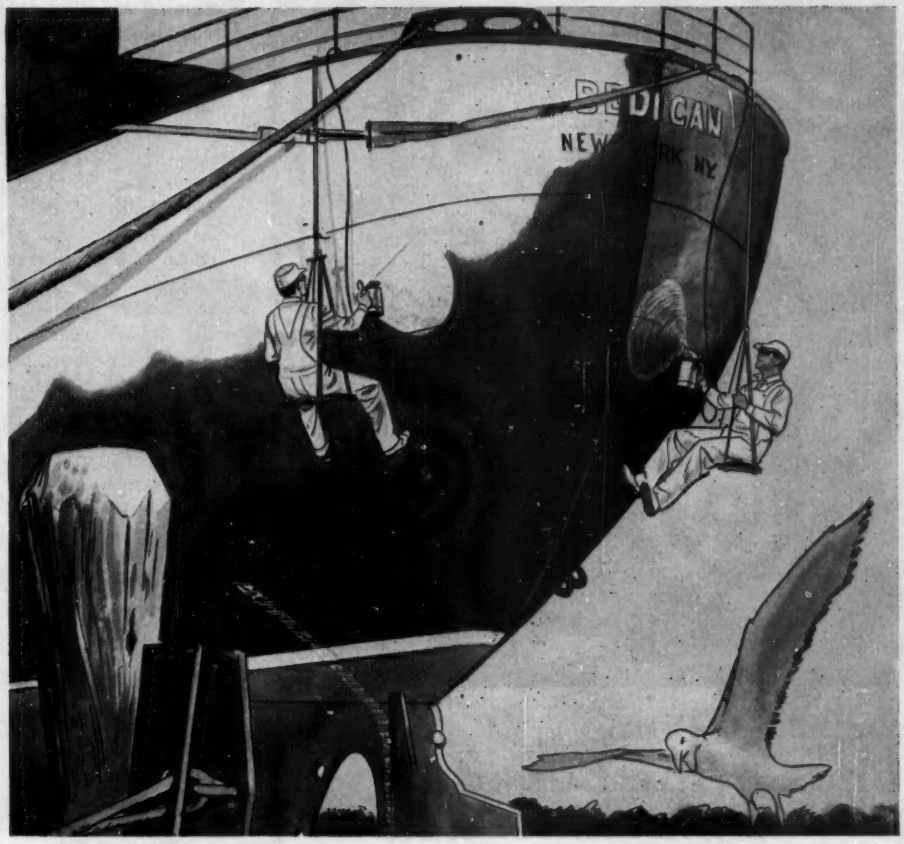
Money for Organizing: In addition



proved corrosion resistance with wash primers

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• •

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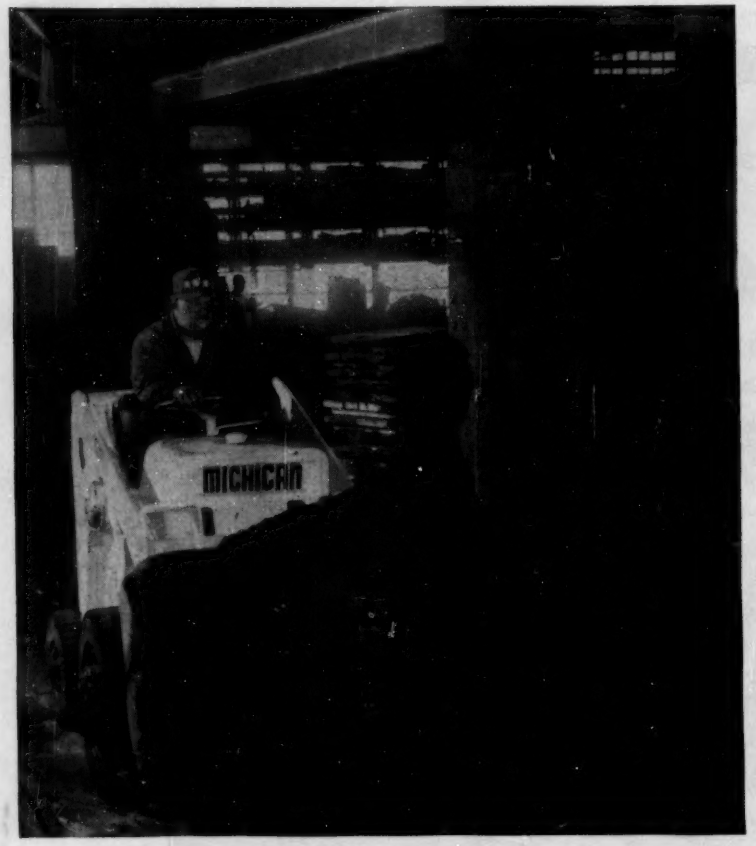

Michigan Model 12B handles 300 tons per day . . .

The bonus in the bucket pays for this machine fast!

Take a close look at the photograph above—an action shot of a MICHIGAN Model 12B Tractor Shovel handling sand at a Chicago foundry. For this operation, the MICHIGAN was purchased to replace another loader of the same *rated* capacity. But the MICHIGAN *moves substantially more tonnage than the other machine* —approximately 300 tons of sand per day. The photo shows how the load is heaped-up well above the 15 cu. ft. capacity of the MICHIGAN bucket. This "bonus" tonnage in the bucket pays for the MICHIGAN fast.

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ADMINISTRATION

to cash allotted by AFL-CIO and the Oil, Chemical & Atomic Workers Union's central treasuries for unionizing of chemical and oil plants, two OCAW district councils are setting up organizational funds of their own. OCAW District 1 (West Coast) Council has voted to collect 10¢/month from each member for the next 12 months—a formula that works out to an $18,000 total. And the District 11 (Ohio, eastern Michigan, western Pennsylvania) Council is setting up a $2,000 matching fund to be used during the next six months to supplement—on a dollar-for-dollar basis—money put up by the OCAW central treasury for "organizing the unorganized" in that district.

Incidentally, OCAW and International Chemical Workers Union have run into another snag on getting AFL-CIO financial help for organizing. OCAW and ICWU have worked out an agreement between themselves, but now Metal Trades Council and Teamsters Union—also AFL-CIO affiliates —are disputing the jurisdiction claimed by the two chemical unions.

KEY CHANGES

Nelson V. Seeger, to associate director, exploratory research, Diamond Alkali (Cleveland).

S. W. Vickery, to director, European and South African operations, Ferro Corp. (Cleveland, O.).

John E. Zacharias, to vice-president, and **Vincent T. Staraci,** to assistant vice-president, McKesson & Robbins (New York).

Clarence L. A. Wynd, to vice-president, Eastman Kodak (Rochester, N.Y.).

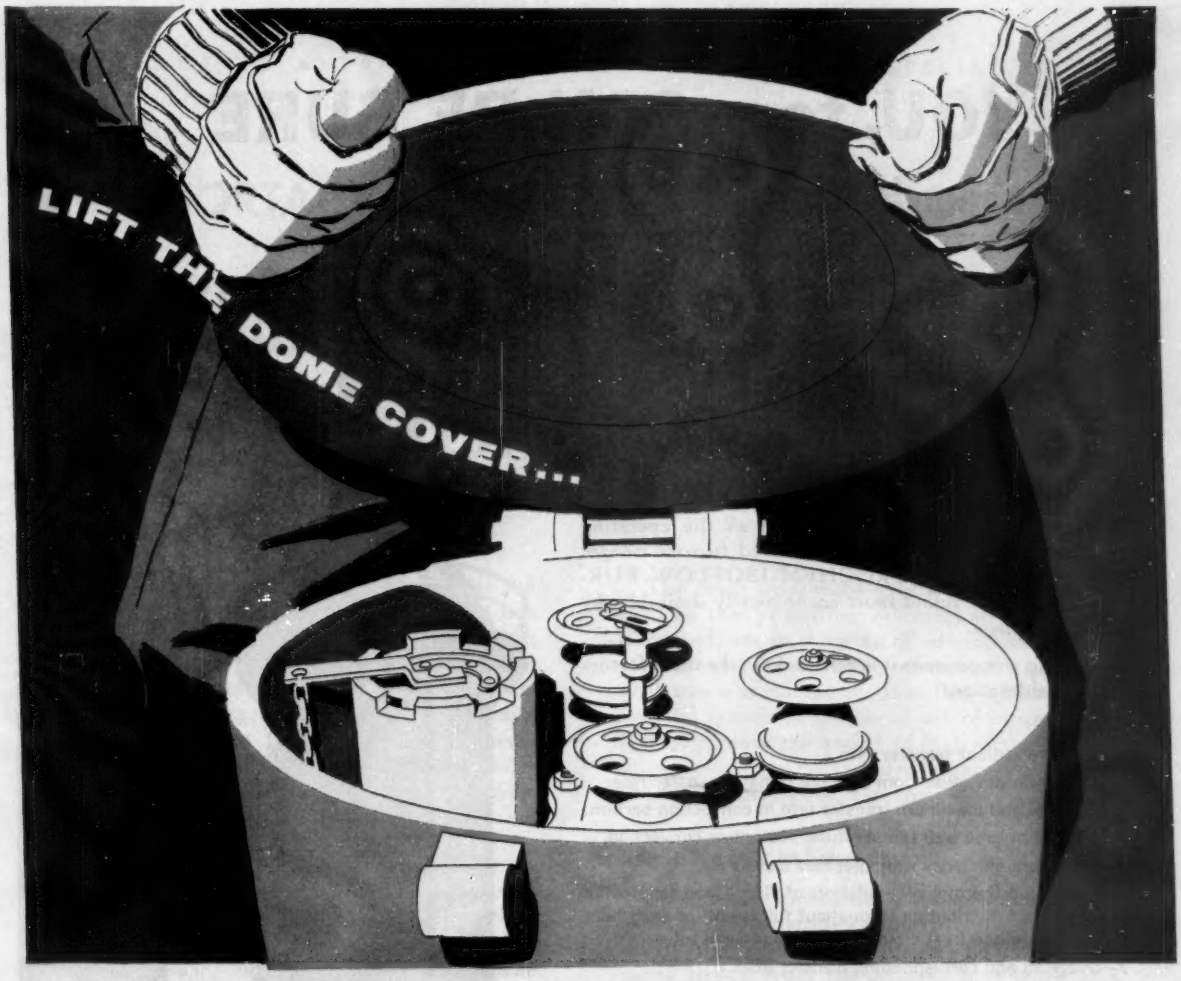
John H. Bouwmeester, to executive vice-president, General Ceramics Corp. (Keasbey, N.J.).

John A. Edwards, to vice-president, and **J. Everett Poole,** to vice-president in charge of production and engineering, Liquid Carbonic Corp. (Philadelphia).

Kenneth L. Weeks, Jr., to superintendent, Brunswick, Ga. plant, Olin Mathieson (New York).

DIED

Howard V. Phillips, 57, vice-president in charge of merchandising, manufacturing division, McKesson & Robbins (New York), at Fairfield, Conn.



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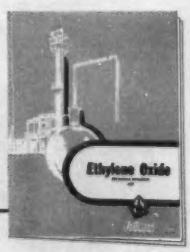
A new 44-page technical bulletin, *Ethylene Oxide*, is now available from Jefferson. In addition to extensive chemical information, it contains diagrams of containers and handling systems. Send for a copy.

Jefferson Chemical Company, Inc., Box 303, Houston 1, Texas.



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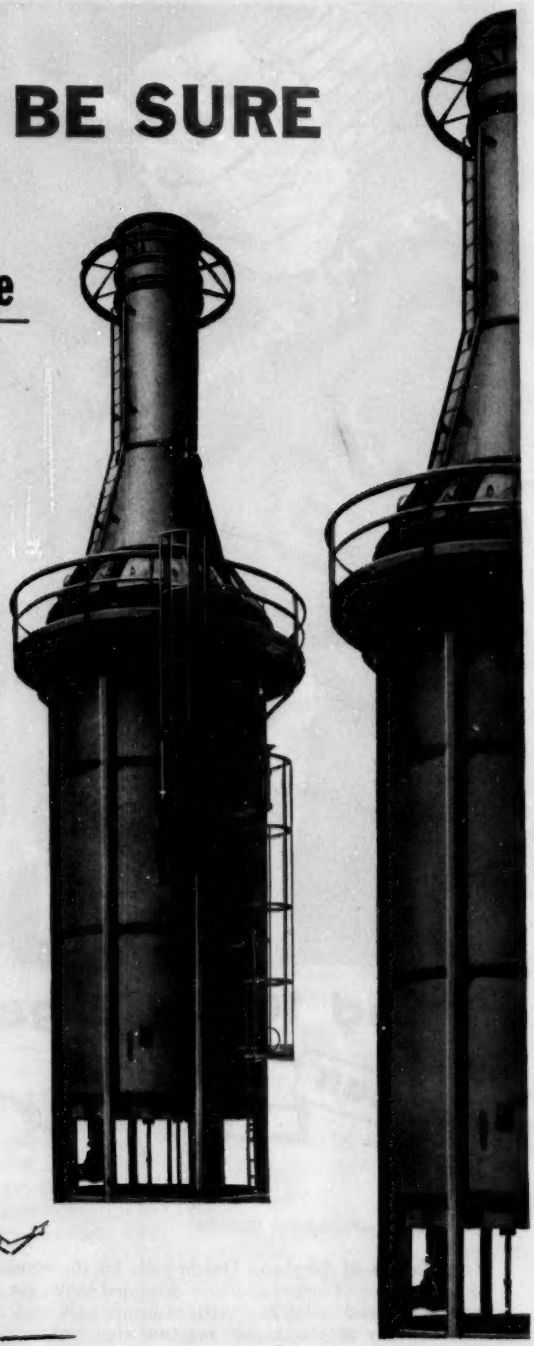

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THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Can Be Done About It?

There is no easy or quick way to overcome the shortage of scientists and engineers that has become a threat to our national security and economic progress. The solution can come only through diligent efforts extending over several years to bring the supply of technically trained people into balance with our needs. Meanwhile, the pressure of the shortage can be relieved if industry, government and education make better use of the limited number of scientists and engineers now available.

Earlier editorials in this series have discussed the dimensions of the shortage of technical manpower, its meaning for our national security and our economic well-being and the causes of the shortage. This final editorial will survey some of the measures that can be taken to overcome the shortage. Most of the proposals presented here have been suggested elsewhere. But in combination they appear to offer the best hope of an answer to this serious national problem.

Soviet Methods Not For U. S.

It is clear that no crash program, inspired by panic and designed indiscriminately to drive hordes of high school students into science and engineering, is suitable for the United States. Even if we adopted Soviet methods of channeling a large portion of our brightest young people into technical fields, it would be at least four years before results appeared in the volume of college graduates. And such an approach would do no credit to the American way of life.

Any crash program, whether it involved totalitarian methods or simply overselling the advantages of technical careers, would be objectionable for other reasons as well. It would jeopardize the quality of scientific and engineering training. It would put many young people in fields where they have little aptitude and deny them to other fields for which they are better equipped. And, if carried too far, it might even result in the overcrowding that was feared prematurely a few years ago.

The most important problems for the long run, as the preceding editorial in this series indicated, are in the area of education. Any real solution must reduce the loss of talented high school graduates who do not continue their education for financial reasons or because of lack of interest. Also, it must improve the quality of high school preparation in science and mathematics and, above all, relieve the critical shortage of teachers.

Basic Needs in Education

Substantial increases in salaries of teachers in most of the nation's school systems are essential if high school students are to receive adequate preparation for courses in science and engineering. Pay scales that have lagged behind rising living costs and salaries available in industry have placed great strain on even the most devoted teachers. There has been a sharp drop in the number of new graduates trained to teach science and mathematics, and of this smaller number many have decided not to follow careers in teaching.

Raising teachers' salaries to more realistic levels must be primarily the job of local school districts, aided by state governments. If, in face of rapid increases in school enrollments, local and state resources prove insufficient, then federal aid will have to be considered. Higher teachers' salaries, however financed, inevitably mean higher taxes. But without appreciable improvement soon, the quality of our entire educational system is in danger.

At the college level also, financial aid is needed to provide scholarships for promising students and to increase faculty salaries. (An earlier series of editorials dealt more fully with these problems, and business aid to higher educational institutions has been mounting at a gratifying rate.)

But not all the educational problems related to the shortage of scientists and engineers can be solved with money. Science and mathematics have steadily been de-emphasized as more youngsters have gone to high school for terminal education rather

How business is helping to relieve the shortage of technical manpower

Summary of a Survey by McGraw-Hill Correspondents

Sponsoring summer study programs for high school teachers
Arranging cooperative work-and-study programs for students
Sponsoring college fellowships and scholarships in science and engineering
Paying tuition of employees taking science and engineering courses
Keeping college faculties abreast of new developments in industry
Hiring high school science teachers for summer and part-time work
Giving old, but usable, laboratory equipment to schools
Cooperating in high school science exhibits
Sponsoring regional science fairs
Sending speakers and training aids to schools
Opening plants for student tours
Analyzing jobs to relieve engineers and scientists of routine work

The McGraw-Hill Department of Economics will be glad to hear of any other ways business is helping relieve the shortage.

than for college preparation. This de-emphasis must be reversed.

Techniques of instruction, furthermore, can stand improvement at all levels of education. Professor E. P. Northrup of the University of Chicago observes: "In the past fifty years . . . there has been a revolutionary change in the character of mathematics, yet not a trace of this change is to be found in the curricula of all but a handful of secondary schools throughout the country." Colleges and universities may have to examine old fetishes about light teaching loads and small classes in order to make more efficient use of their faculties.

What Industry Can Do

Industry has the immediate problem of better utilization of available technical manpower and the long-range responsibility of helping increase our resources of trained people. Frantic recruiting practices and reckless bidding up of starting salaries—financed largely by government money for defense orders — are not the answer. There is need for earnest consideration of incentives for experienced scientists and engineers, who too often must look to sales or executive positions for adequate financial recognition.

Industry in many instances could make more efficient use of engineers and scientists by shifting work to technicians, clerical personnel and even machines. One company found that 15% of the time of an engineering design group was spent on routine jobs and that this valuable time could be saved by adding a technician and a clerical worker to the group.

Other potential sources of technical manpower could be tapped more extensively to relieve the shortage. Very few women have entered what has been traditionally a man's world. Negroes are only slowly gaining educational and employment opportunities in technical fields. And many experienced older men can still give useful service.

A Good Beginning

Much is being accomplished already in efforts to attract more young people into scientific and engineering careers. A summary of some of the things business is doing is presented above. Other notable contributions are being made by such organizations as the professional engineering and scientific societies (especially through their manpower commissions), the National Science Foundation, the National Research Council, the National Education Association, the National Merit Scholarship Foundation and the Thomas Alva Edison Foundation.

Results are beginning to appear in rising enrollments in engineering schools and technical institutes. Between 1951 and last year, according to McGraw-Hill's annual survey of technical institutes, enrollments in these schools rose from 46,000 to a record 67,000. Engineering enrollments rose in the same period from 166,000 to 243,000. A rising tide of graduates is already being made available to American industry.

This is a good beginning. But only with wider appreciation of the serious implications of the shortage of scientists and engineers and intensified efforts on the part of business, government and education to relieve the shortage can we hope to overcome this threat to our national security and economic well-being.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

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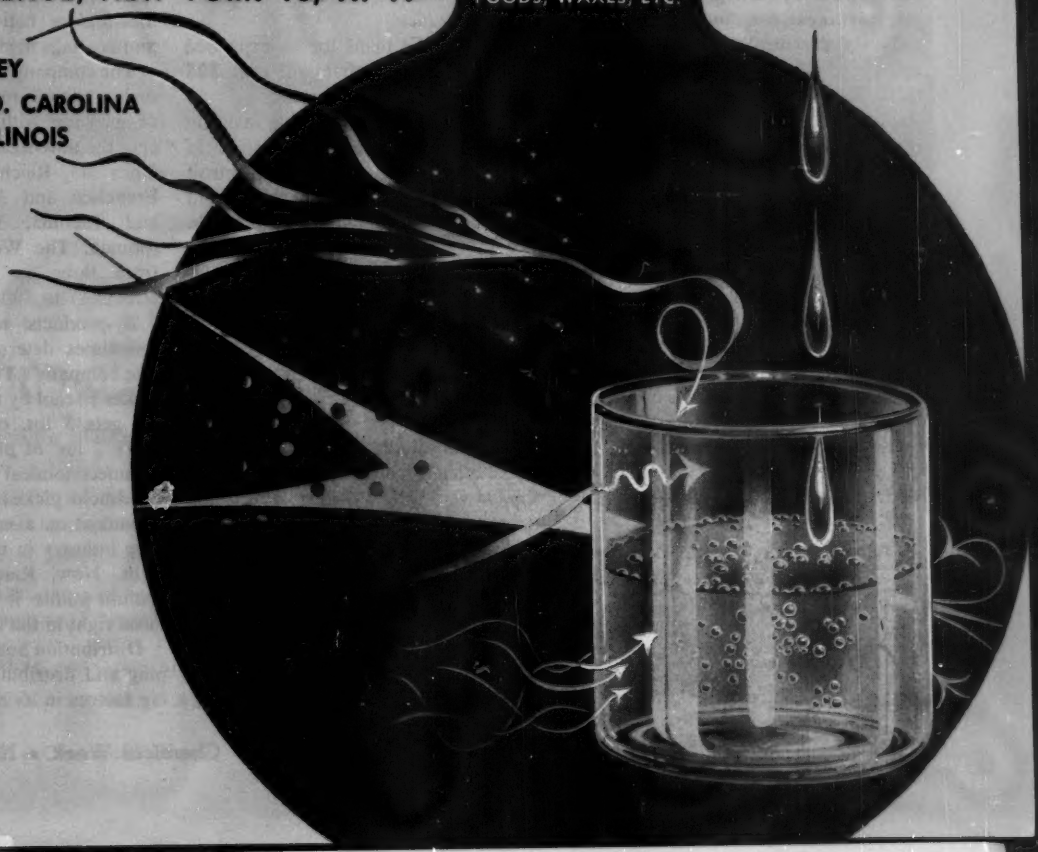

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MORE TO COME: Reichhold's chain of local plants is set to grow again, reaffirming a basic company philosophy.

Close to Market, Close to Sales

This week's public sale of 200,000 shares of Reichhold Chemicals stock (CW, Nov. 3, p. 23) augurs a shift into high gear for the firm's growing, uniquely decentralized marketing set-up.

To Reichhold, marketing decentralization means locating plants in areas of greatest potential. The firm now has plants at 13 key U.S. marketing sites, can make or store products in specific areas of demand.

With this policy, Reichhold expects to chalk up $60 million in sales volume this year, an increase of nearly $7 million over 1955.

Bigger in '57: But figures are only part of the sales picture. A look at the company's '57 expansion plans shows some interesting facts about its marketing philosophy. Reichhold will:

- Spend probably $5 million to bolster production of established products at 10 of its 13 domestic plants.*
- Push a "several-million-dollar" plan that will take the firm into petrochemicals.
- Carry out plans for an expanded research program that will cost $25 million in the next five years.

Too, Reichhold is mapping invasion of new markets: melamines (now in production at San Francisco, Detroit and Elizabeth, N.J.), epoxies, and more recently, modified polyamides. The latter two will prop Reichhold's drive to fill booming demand in structural plastics and thixotropic paints.

The push into petrochemicals, sparked by a long-term purchase agreement with Escambia Chemical, is the latest move toward vertical integration in basic chemicals, including sulfuric acid, oleum and others, that will buttress Reichhold's security of raw-material supply. In '58, Escambia will make methanol at Pensacola, Fla., sell it to Reichhold for conversion into formaldehyde. Reichhold expects $10 million/year sales from this alone.

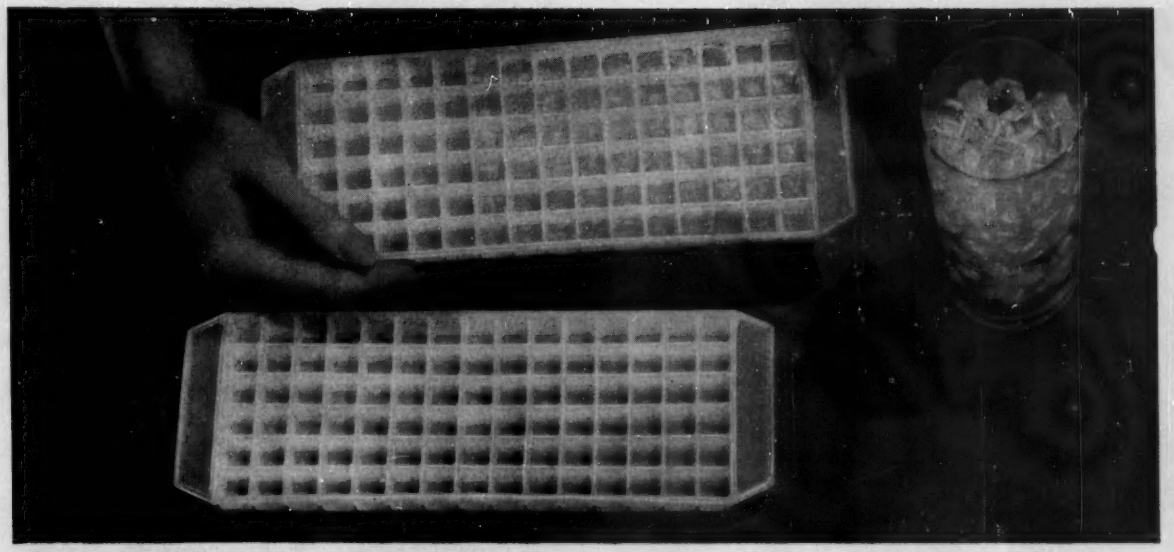
These plans, says Reichhold, spell better service for customers, bigger profits for the company. They underscore a philosophy of producing near consuming markets, assure customers of quick, sure availability. The firm also offers technical service at each location—a big plus in the plastics and coatings field.

The company's West Coast manufacturing expansion is a prime example of growing with the market, in this case the now-sizable plywood industry. Since '43, Reichhold's plants at San Francisco and Azusa, Calif., Seattle and Tacoma, Wash., have mushroomed. The West Coast staff grew from three (a technical man, two salesmen) to 300.

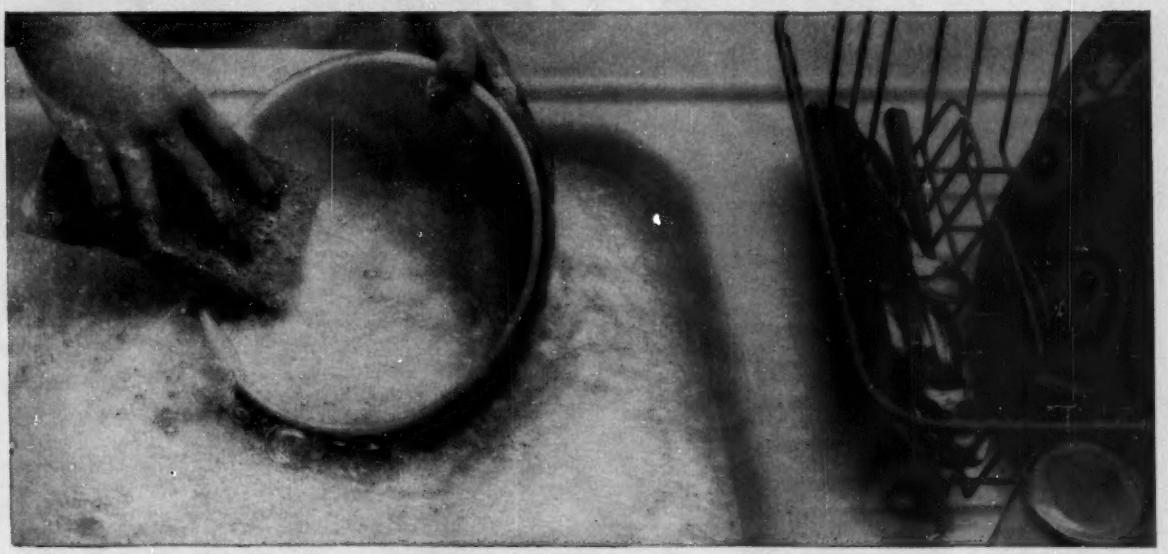
By-products, too, adds Reichhold, sometimes determine plant locations. The company's Tuscaloosa, Ala., plant makes phenol by the sulfonation method, gets 5 lbs. of sodium sulfite for every 2 lbs. of phenol. Sodium sulfite is uneconomical to ship, so when Reichhold picked the Tuscaloosa site, it banked on a soon-burgeoning kraft pulp industry in the area. This proved right. Now, Reichhold sells all the sodium sulfite it produces at Tuscaloosa right in the area.

Distribution Setup: Reichhold's shipping and distribution policies are two big factors in its rising sales. The firm

*Expansion is planned in the following commodities: Azusa, Calif.—phthalic anhydride, plasticizers, surface-coating resins; Ballardvale, Mass.—phenolic resins; Charlotte—formaldehyde. Elizabeth—plasticizers, melamines, epoxies; Detroit—phthalic anhydride, formaldehyde, melamines; Kansas City, Kan.—thermal insulation plastics; San Francisco—polyvinyl acetate, melamines, plasticizers; Seattle—sodium pentachlorophenate; Tacoma—formaldehyde, pentachlorophenol; Tuscaloosa—phenol, formaldehyde, pentaerythrital, surface-coating resins.



ETHYLENE for plastics



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Wilner Wood Products Co., Norway, Me.

privately owns and operates a total of 50 tank trucks, tractors, vans and stake trucks. In addition, it leases 150 tank cars and 15 contract-carrier tank trucks. Result of this distribution setup, says Reichhold, is a substantial saving in shipping costs for consumers.

More Coming: Reichhold has no intention of staying put. It is already hinting that the present rate of production boosts will be followed by bigger ones, probably financed through more stock issues once the firm has a N.Y. Stock Exchange listing. And it's a good bet that decentralized production and marketing will play a big part in this future expansion.

Tapping the Farm

Long-range help for the severe shortage of marketing personnel may result from a new program sponsored by the National Sales Executives, Inc. It's planning to tap the large manpower pool created by 75% of farm children who are seeking employment in urban areas.

National Sales Executives, Inc. plans to distribute literature, films and slides. Additionally, NSE will offer personal guidance and consultation to farm youths by cooperating closely with local schools and numerous other organizations.

SALES RISER: Victor executives* scan motivation research results.

Baking Facts Make the Sale

It takes a compelling reason to undertake consumer motivation research if a chemical company doesn't sell to consumers. Victor Chemical has such a reason: What do consumer attitudes about home baking mean in sales of calcium phosphate to manufacturers of self-rising flour?

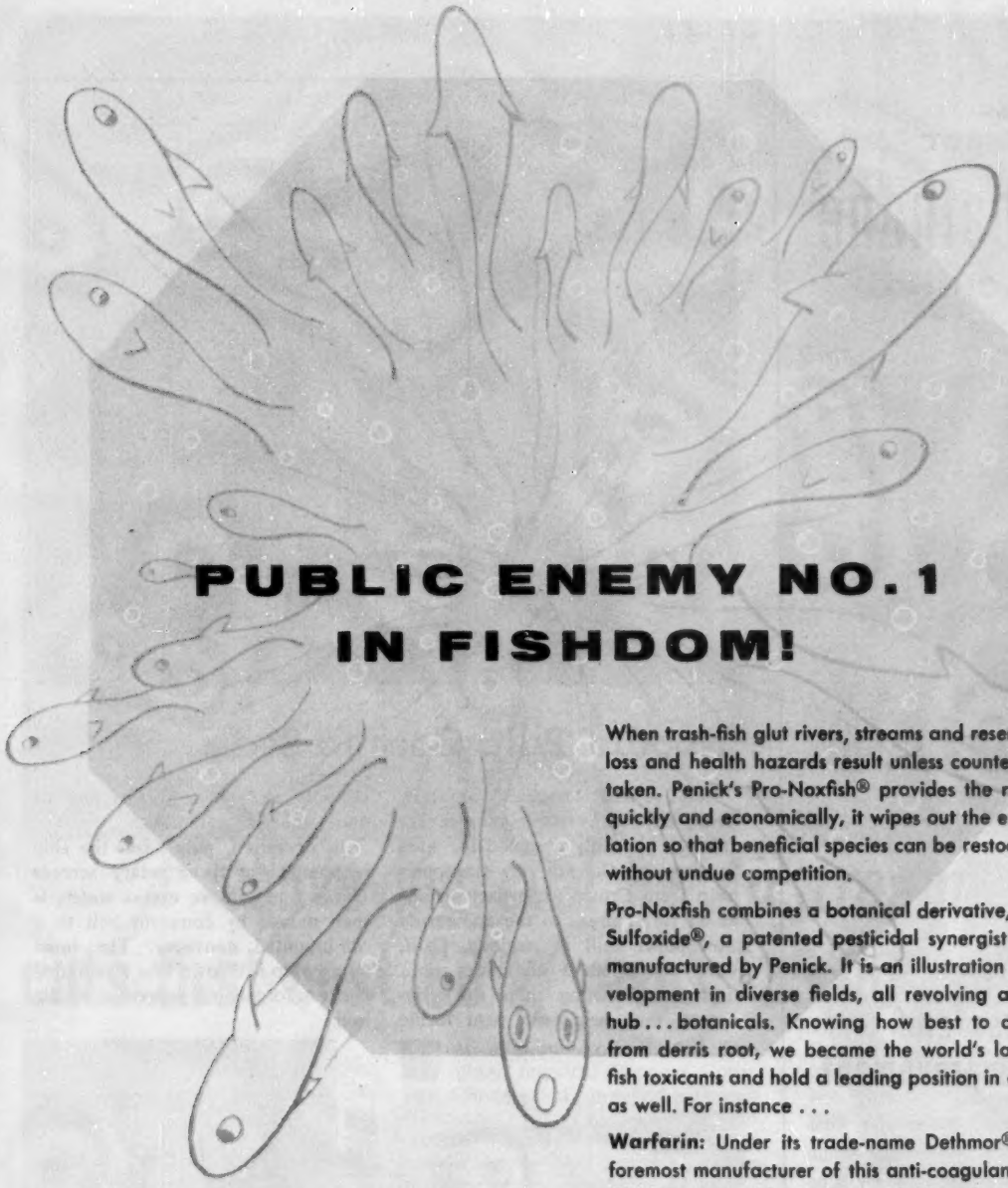
Victor's findings: about 80% of all home baking in 11 southern states (the largest market) is a potential market for self-rising floor, and, indirectly, could be a profitable outlet for Victor's product. (Note that about 6.5 gms. of monocalcium phosphate is used in each pound of flour.)

Based on some 500 interviews, 55 of which were "depth type," the study revealed the frequency and kind of baking, materials used, reasons why housewives do or do not bake, and why they use or don't use self-rising flour. One conclusion, says Victor: millers wanting to sell more self-rising flour should emphasize the "emotional rewards" of home baking.

Victor has outlined its data to several groups of milling industry executives, will make complete results available to interested companies. It will not promote directly to the consumer.

How much more calcium phosphate Victor will sell as a result of its promoting self-rising flour is difficult to estimate. Leavening agents are added to regular flour by the housewife, thus only a sales transfer may result. Even so, the push is worth the effort, says Victor, because the trend is toward convenience in foods and mixes. And by boosting baking in general, an over-all sales increase may occur.

*Left to right: August Kochs, chairman of the corporation; E. Glenn Fite, manager, milling industry sales; Rothe Weigle, president; and Morris R. Stanley, vice-president and director of sales.



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Pro-Noxfish combines a botanical derivative, rotenone, with Sulfoxide®, a patented pesticidal synergist perfected and manufactured by Penick. It is an illustration of Penick's development in diverse fields, all revolving around a single hub . . . botanicals. Knowing how best to derive rotenone from derris root, we became the world's largest maker of fish toxicants and hold a leading position in other pesticides as well. For instance . . .

Warfarin: Under its trade-name Dethmor®, Penick is the foremost manufacturer of this anti-coagulant developed by the Wisconsin Alumni Research Foundation as a highly effective weapon against rats.

Pyrethrum: Penick is a prime source, having plantations abroad and a quarter-century experience in importing and processing this rapid-action, safe insecticide.

Ryania: This botanical-based insecticide selectively attacks codling moths and sugar cane borers while encouraging beneficial species of insects. Penick is the sole supplier.

Insecticides, rodenticides and fish toxicants are another of the many fields in which our world-wide resources and diverse laboratory and manufacturing facilities are important.

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Nitroethane
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for process and product improvement

Nitroethane is one of four versatile Nitroparaffins now available in commercial quantity for industry. This new chemical family is believed to hold more promise for process and product advancement than any other chemical group developed in the past twenty-five years. Learn how the NP's may be of help in improving your present product or in creating new products.

write:
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NEW YORK 16, N. Y.

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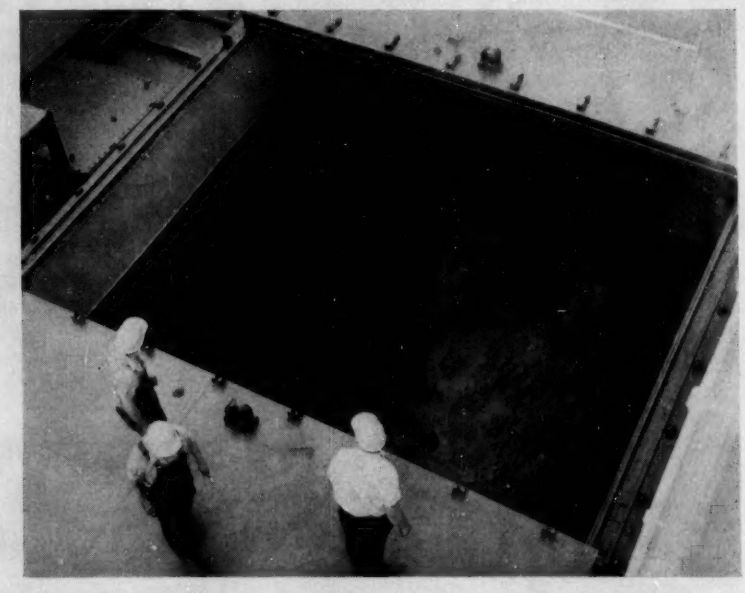
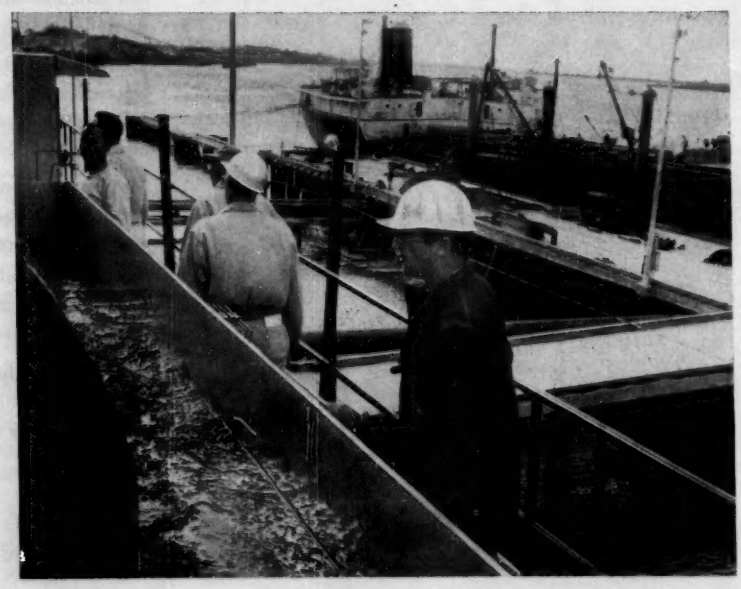
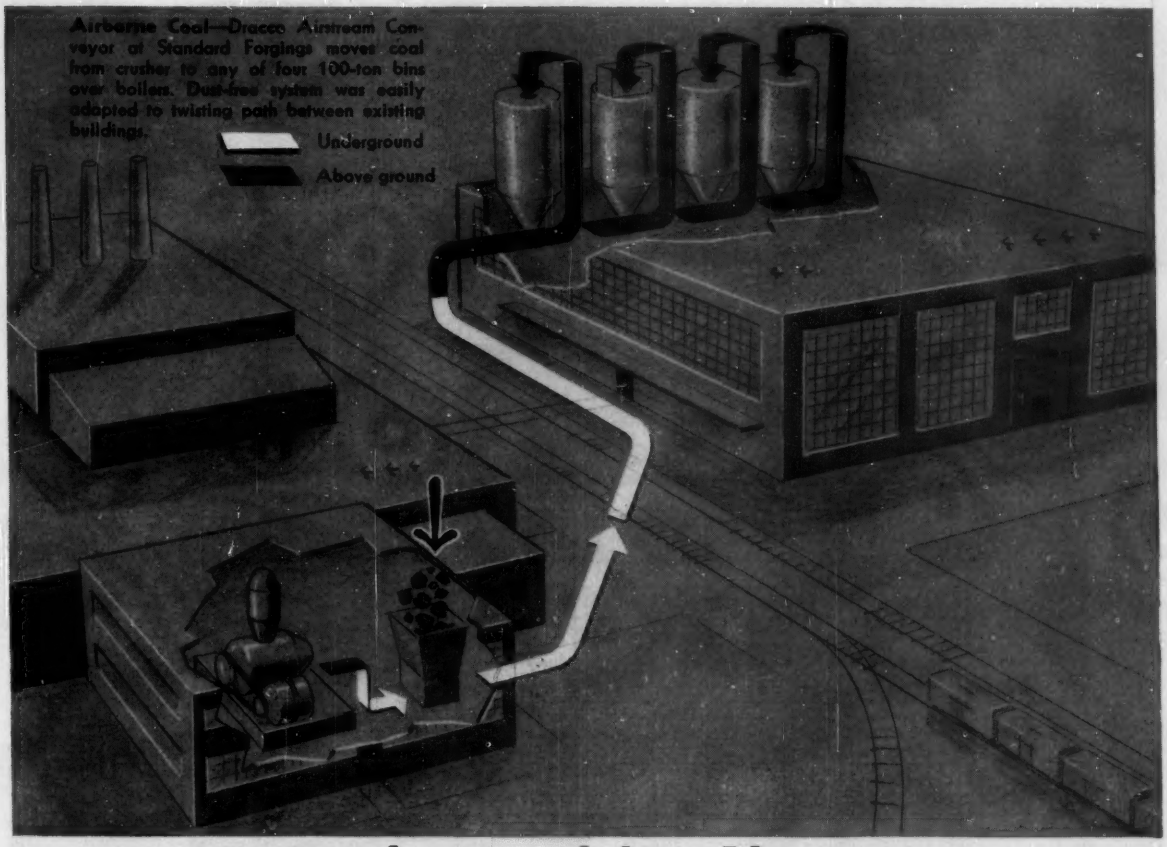


'Noodle' Pulp Goes to Sea

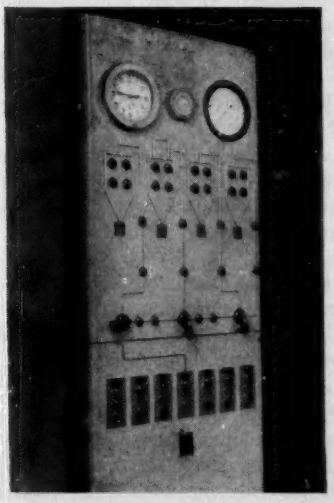
WET PULP "noodles" are now being shipped by oceangoing tanker (above). Specially designed for such service, the *Duncan Bay* transports pulp from Crown Zellerbach's Canadian forest areas to the company's new paper mill at Antioch, Calif. CZ's new method eliminates both drying and baling pulp for shipments, thus helps the firm locate its pulp mills near forests and its paper mills near markets.

In operation, pulp from the ship is pumped to three rotary screens (*below*) to remove excess water, is then moved by conveyor belt to a rail-mounted conveyor. The now-damp pulp is thrown into a retaining basin before being processed in the mill.




Airborne Coal—Dracco Airstream Conveyor at Standard Forgings moves coal from crusher to any of four 100-ton bins over boilers. Dust-free system was easily adapted to twisting path between existing buildings.
Underground
Above ground

conveying coal by *Airstream* cuts first cost 60%, saves $35,000 per year



Control Station—One man operates complete Dracco coal handling system from graphic control panel. Lights show flow path, switches permit remote control.

In a recent modernization program, Standard Forgings Corp., East Chicago (Ind.) installed a Dracco Airstream Conveyor to handle coal from crushers to boilers. This move has paid off in a big way—first cost was 60% less than an all-mechanical conveyor . . . savings in coal and other costs have piled up at the rate of over $35,000 per year!

Compared with the old system, here are the Dracco-introduced improvements–one operator controls system . . . daily coal requirements moved in one shift instead of three . . . use of lower grade coal costing one dollar less per ton . . . annoying, costly and potentially dangerous coal dust problem licked.

With an automatic Dracco Airstream Conveyor, coal is transported at 30 tons per hour through a dust-tight system. One operator, aided by bin-level indicators and remote-controlled diverter gates, controls all handling from a central switch panel. There is no waste, loss or spillage of coal. System maintenance is practically zero.

If you handle coal or any other dry bulk material, you can move it anywhere . . . with less labor . . . lower material cost . . . and no dust, danger or contamination with an Airstream Conveyor. Call in a Dracco engineer today.

DRACCO CORPORATION

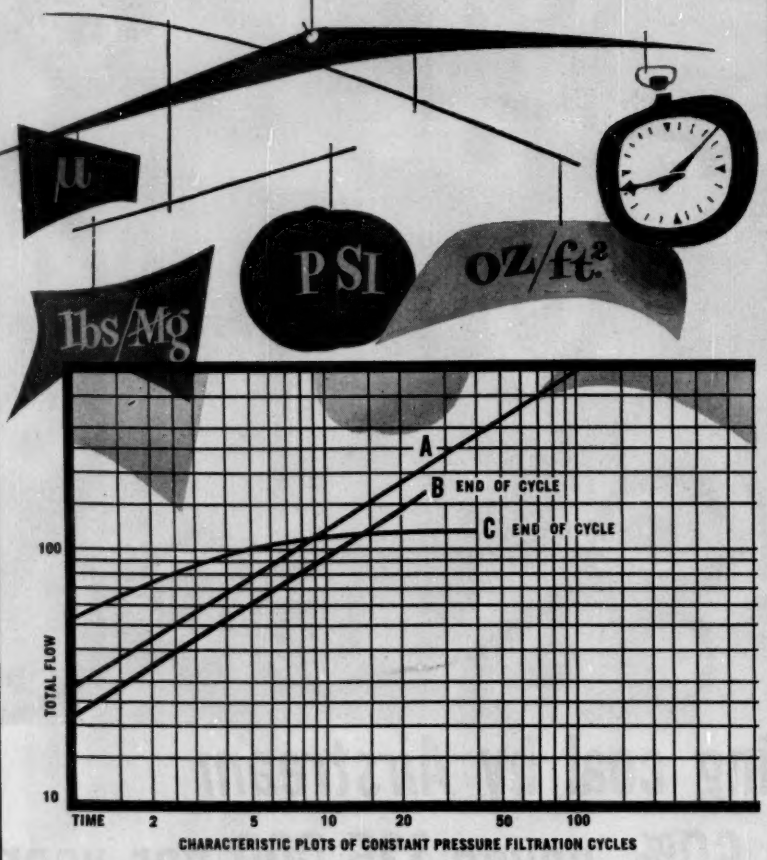
4080 East 116th Street • Cleveland 5, Ohio

Dracco Bulletin 529, "Airstream Conveyors", contains detailed information on equipment and uses. Shows examples. For your copy, write Dracco today.

DRACCO *Performance Proved*

Airstream **CONVEYORS · DUST CONTROL EQUIPMENT**

All these must balance...



CHARACTERISTIC PLOTS OF CONSTANT PRESSURE FILTRATION CYCLES

for MOST EFFICIENT FILTRATION

These plot lines, established in actual tests under plant conditions, clearly point up the importance of balancing *all* the filteraid factors — particle size; particle size range and distribution, precoat and body feed requirements. Line A shows the satisfactory flow rate and long cycle length obtained with such balance. Line B shows the result of too much filteraid — lower flowrate and short cycle, due to rapid filling of the cake space in the filter. Line C demonstrates the results of either insufficient filteraid or too coarse a filteraid; note the rapid drop in flow rate and the short cycle caused by solids blinding the filter screen.

For most efficient filtration, Dicalite provides a complete range of dependable, uniform filteraids to meet the requirements of practically any filtration. And Dicalite service engineers, working in your own plant, can help you "balance" your filtrations for highest clarity, optimum throughput and longer cycles.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION: GREAT LAKES CARBON CORPORATION, 612 S. FLOWER ST., LOS ANGELES 17, CALIF.

SALES

DATA DIGEST

• **Plastic pipe:** Brochure furnishes comprehensive data on chemical resistance, physical properties, flow rates, dimensions and other characteristics of unplasticized polyvinyl chloride pipe. Colonial Plastics Mfg. Co. (Cleveland).

• **1, 5 Pentanediol:** 6-p. booklet gives physical properties, dehydration, esterification and dehydrogenation reactions, physiological properties, bibliography and suggested applications in resins and polymers, plasticizers, brake fluids and other uses. Carbide and Carbon Chemicals Co. (New York).

• **Wash primers:** 12-p. brochure describes the properties of Butvar (polyvinyl butyral) and Formvar (polyvinyl formal) preparation of wash primers, suggested formulations, application of the primer to the metal, properties of the formulated primers, and potential industrial end-uses. Shawinigan Resins Corp. (Springfield, Mass.).

• **Caustic soda:** 40-p. booklet describes handling procedures and equipment for caustic soda. Charts and tables are used extensively to present physical data. Hooker Electrochemical (Niagara Falls, N.Y.).

• **Calcium hypochlorite:** 28-p. booklet outlines use of "Pittchlor" as a chlorine germicidal agent in a variety of industries. Columbia-Southern Chemical Corp. (Pittsburgh).

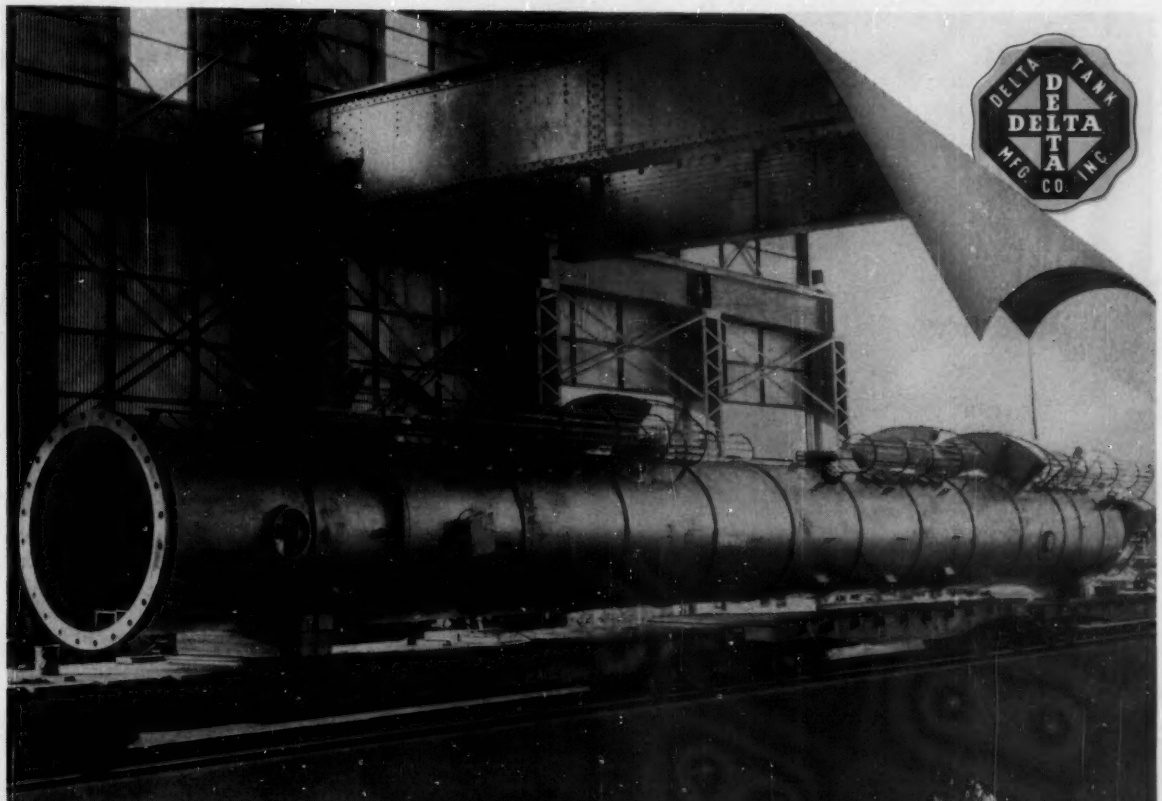
• **Resins:** 4-p. bulletin gives color stability, compatability, solubility, and other physical data for "Piccolyte" resins, suggests applications as a rubber extender and in pressure-sensitive adhesives. Harwick Standard Chemical Co. (Akron, O.).

• **Diatomaceous earth:** 28-p. report describes deposits in Arizona and includes chemical assay results. Arizona Development Board (Phoenix, Ariz.).

• **Water softeners:** Bulletin describes the operation and benefits of using hot lime-zeolite softeners. Cochrane Corp. (Philadelphia).

• **Pigmented polystyrene:** Brochure furnishes information on light transmission and physical properties, formulation, product design and fabricating and finishing of "EVENGLO" brand polystrene. Koppers Co. (Pittsburgh).

• **Colloidal dispersions:** Bulletin presents suggestions for the correct use of colloidal graphite and molyb-



You should see what's inside!

This depropanizer fabricated for a Gulf area customer is 102″ I.D. x 1-$^{5}/_{16}$″ x 95′. It weighs 242,628 pounds and was shipped in one section. Another example of the engineering skill and fabrication experience available at Delta to meet your pressure equipment requirements.

Delta's modern facilities are geared to produce the type of pressure equipment needed by the Chemical, Petro-chemical and Petroleum industries. Delta's Baton Rouge plant is located right in the heart of the great new Gulf Petro-chemical area.

Complete information on Delta's facilities, or your specific equipment needs, is available at your request.

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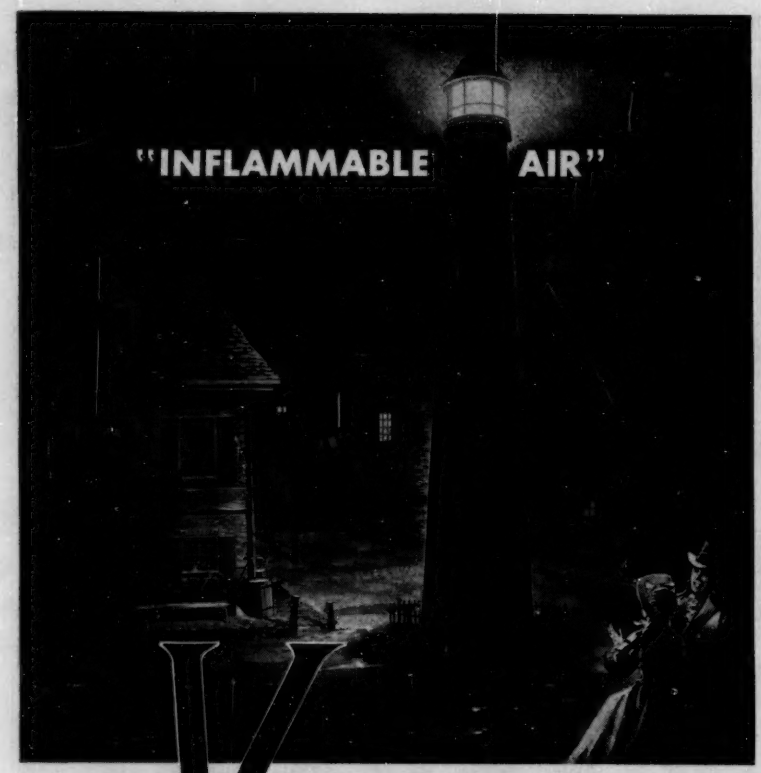


This VIRGINIA "first"

is still a plus for your Plant—

In 1803, a street lighthouse forty-feet high rose at 11th and Main Streets, Richmond. Atop it blazed a lamp burning what the inventor, Benjamin Henfrey, called "inflammable air." Though short lived, this was probably the world's first gas lamp post. And it lighted the way for today's vast use of gas by Virginia's growing industries.

Your new plant in Virginia can choose from natural gas . . . abundant, low-cost electricity . . . and limitless supplies of top grade coal. At your door are minerals ranging from easily quarried limestone to titanium . . . huge forest reserves of hard and soft wood . . . industrial farm crops, including peanuts, soy-beans, cotton, tobacco . . . and the nation's largest output of marine animal oils.

To help you profit from these resources, you have the help of ample Southern manpower and the mild, beneficial climate. You are central to the East . . . with favorable freight rates to the Midwest. And the busy ports of Hampton Roads are your open door to world markets.

For confidential facts about available sites in this land of friendly people, good living, and business-like government that *likes* business . . . write or call

DIVISION OF PLANNING AND ECONOMIC DEVELOPMENT

Virginia Department of Conservation and Development
State Finance Bldg., Richmond, Va. • Telephone 3-3449

FACTS FAVOR VIRGINIA

SALES

denum disulfide dispersions in high-temperature lubrication. Acheson Colloids Co. (Port Huron, Mich.).

• **Chemical dealers:** Trade list gives names and addresses of German chemical importers and dealers, type of products carried and the industries each serves. Bureau of Foreign Commerce (Washington 25, D.C.).

• **Potassium silicates:** 7-p. booklet gives physical properties and suggests uses in phosphor particle adhesion. welding rod flux coating, soaps, and masonry paint pigment vehicles. Philadelphia Quartz Co. (Philadelphia).

• **Paper selector:** 'Slide rule' permits determination of most suitable paper for multiwall bag packaging by giving information on protection, paper properties, and current applications. St. Regis Paper (New York).

• **Copper oxide:** Folder discusses properties, uses and benefits of brown copper oxide in fertilizers, feed supplements and fungicides. Calumet Division, Calumet & Hecla, Inc. (Detroit).

• **Waxes:** Brochure gives prices, specifications, physical properties and typical formulations for a variety of industrial waxes. Applications are suggested in cosmetic, chemical and polish fields. International Wax Refining Co. (Valley Stream, N.Y.).

COMPETITION

• Dexter Chemical Corp. (New York) has formed a paper chemicals division. Initially, sales efforts will be aimed at the New England area.

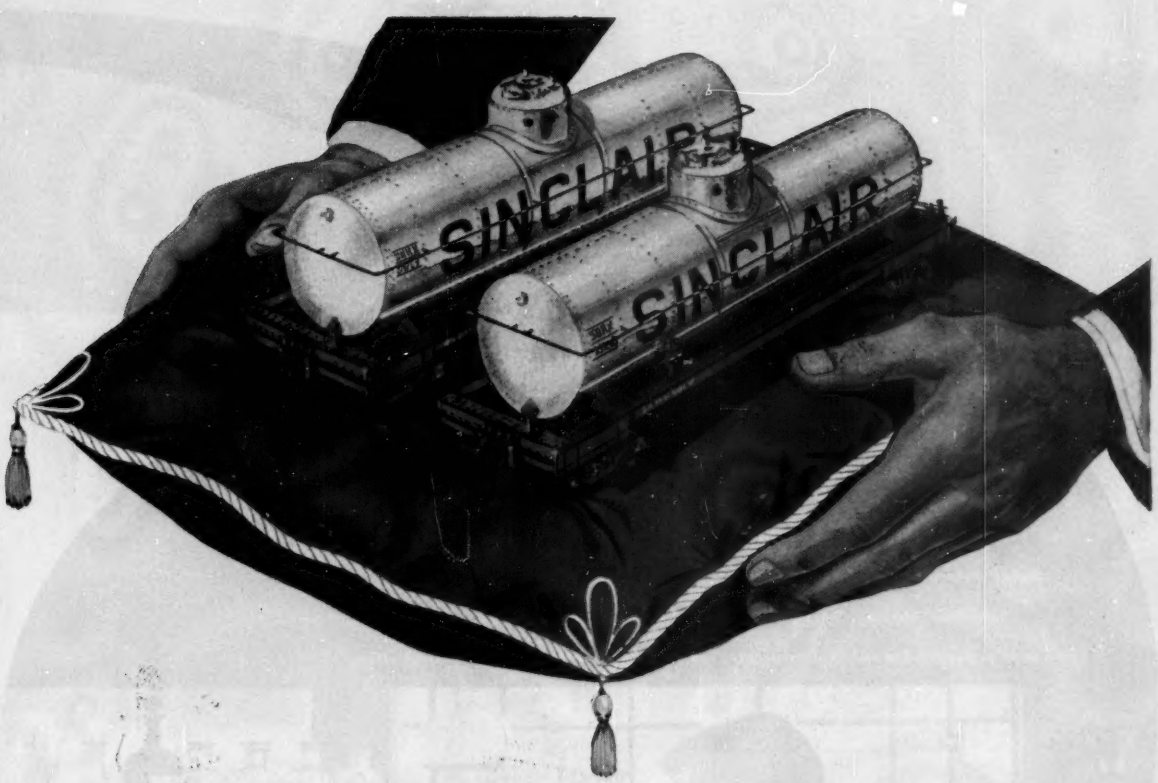
• Schenley Laboratories has announced plans to double its field sales staff, greatly expand its sales and advertising activities.

• Pacific Vegetable Oil Corp. has selected Welch, Holme and Clarke Co. (New York) to distribute its products in the New York metropolitan area, in other parts of New York and New Jersey and in Pennsylvania.

• California Spray Chemical will build two new warehouses in Arizona: a 10,000-sq.-ft. structure at Casa Granda and a 7,000-sq.-ft. facility at Wellton.

• Archer-Daniels-Midland has moved its Chemical Products Division from Cleveland to Minneapolis.

• Ohio-Apex Division of Food Machinery and Chemical Corp. has relocated and expanded its Los Angeles facilities.



...SINCLAIR CHEMICALS ALWAYS RIDE FIRST-CLASS!

Two special fleets of tank cars are added assurance that you get what you pay for when you specify Sinclair! To guard against contamination, Sinclair ships odorless solvents and aromatics in separate tank car fleets used exclusively for this purpose. It saves trouble!

TRULY ODORLESS SOLVENTS— Sinclair's team of truly Odorless Solvents, both Light (340-405° F.) and Heavy (375-465° F.), are synthetically produced from carefully selected hydrocarbons to insure the uniformity, stability and superior quality required by manufacturers of odorless paints. Available in full, or split tank car quantities.

HIGH PURITY AROMATICS— Toluol (1° nitration grade), Xylol (5°), and Paraxylene (98%) are being produced by modern Udex extraction facilities at Sinclair's Marcus Hook, Pa., refinery. Available in full, or split tank car quantities.

When your manufacturing processes call for fast and reliable service, and top quality in petroleum-derived chemicals, Sinclair Chemicals, Inc. is ready to serve you. For complete information call or write to:

SINCLAIR CHEMICALS, INC.

(Affiliate of Sinclair Refining Company)

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155 North Wacker Drive, Chicago 6, Illinois • Phone: Financial 6-5900

Here's only a partial listing of Vancoram chemicals serving industry. C.P. grades and many other special chemicals are available for specific applications.

	Typical Analysis	
Ammonium Metavanadate — Technical grade	NH_4VO_3	min. 99%
Vanadium Pentoxide		
Technical grade — air dried	V_2O_5	83/86%
Technical grade — fused form	V_2O_5	88/91%
Purified grade	V_2O_5	99.5/99.7%
Sodium Orthovanadate		
Technical grade — $(Na_3VO_4 \times H_2O)$	V_2O_5	approx. 26.75%
	Na_2O	approx. 22.60%
Commercial grade — $(Na_3VO_4 \times H_2O)$	V_2O_5	approx. 23.00%
	Na_2CO_3	approx. 15.00%
Sodium Metavanadate — Technical grade	V_2O_5	61.40%
	Na_2O	20.90%
Vanadium Chloride — Syrupy — C.P.	$V_2O_2Cl_4 \cdot 5H_2O$	approx. 82.00%

Application problems? For technical assistance, just call your nearest Vanadium District office.

What's New in VANCORAM VANADIUM CHEMICALS

The ever-expanding volume and scope of the chemical industry affects more and more raw material sources. Owing to their special properties, Vancoram chemicals are keeping pace with this growth. They are increasing in direct and indirect use: in the production of dyes, inks and ceramics, as well as in the preparation of catalysts for the production of synthetic fibers, sulphuric acid and organic intermediates.

Now, thanks to a new plant at Cambridge, Ohio—which combines VCA's chemical production, research and pilot plant operations under one roof—Vancoram chemicals are produced in greater quantity to meet the growing needs of growing industries. What's more, these modern research, development and testing facilities assure the purity and uniformity standards that today's high level production demands.

VANCORAM

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y. • Pittsburgh • Chicago • Detroit • Cleveland

Producers of alloys, metals, and chemicals

Our 50 Years of Progress 1906 1956

C W Report

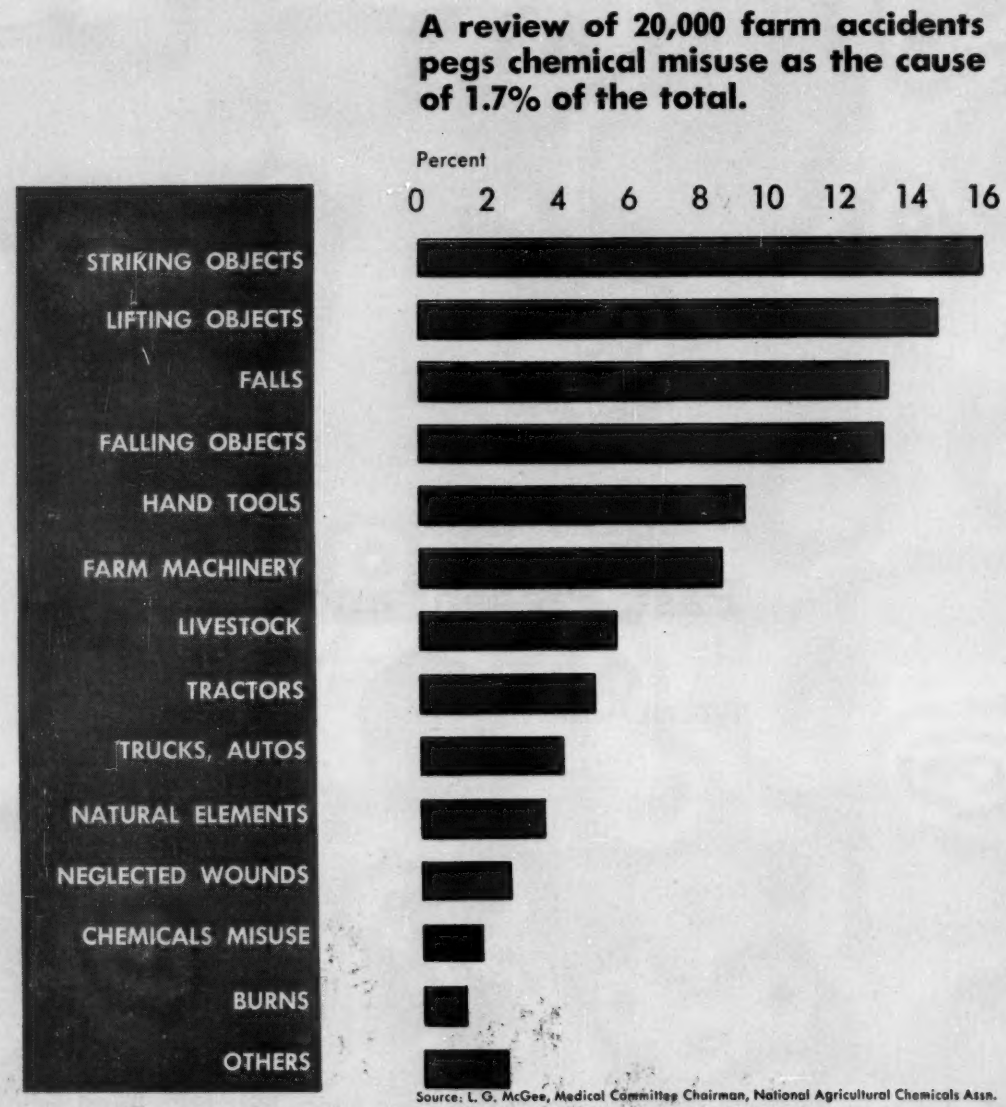
In Three Parts

Pesticides

Past, Present and Prospects

by Carl D. Fischer

3. Fungicides, Herbicides



CASUALTY CAUSES: Agricultural chemicals boast a top-notch safety-in-use record—still another factor . . .

Behind Surging Pesticide Demand

This is the last installment of a three-part report on pesticide chemicals—valued at more than $260 million in sales and expected to reach $1 billion by 1975. Earlier installments (CW, Oct. 27, Nov. 3) analyzed in detail the present status and prospects of such important pesticide products as insecticides, miticides, repellents and fumigants. This final portion covers fungicides and herbicides—also examines the impact of the Miller amendment and looks into the pesticide industry's big problem—sales forecasting.

Developing cheap but effective fungicides is a big challenge to the pesticides industry, for the ravage of crops by fungus diseases is annually taking a $3 billion/year bite. Half this loss is on corn, cotton, oats and wheat, relatively low-value/acre crops that command little control attention.

Today fungicide sales stand at about $82 million/year, or about 32% of the entire pesticide market. And copper sulfate—the same fungicide that was top-seller in volume 100 years ago—is still the leader (about 108 million lbs./year, worth some $19.4 million). The runner-up, sulfur (roughly 150 million lbs./year selling for some $10.5

Leading Pesticide Producers

million), has held second place for a century.

Copper sulfate still finds ready acceptance in the control of banana disease (Sigatoka, or leafspot), and a sharp rise in copper prices has helped to keep copper sulfate high in sales dollar volume.

But since the discovery by Tisdale and Williams in 1934 of dithiocarbamate fungicides, a number of outstanding new organics—e.g., captan, nabam and glyodin—have come into their own. Result: both copper sulfate and sulfur have declined substantially.

Foliage Fungicides

Oldest member of the dithiocarbamate family is ferbam—ferric dimethyldithiocarbamate. It finds wide application against diseases of fruit crops, nuts and many ornamental plantings, is also used against blue mold in tobacco seed beds. One of ferbam's most outstanding accomplishments to date is in controlling cedar rust on apples.

Ziram, the zinc dithiocarbamate salt, has given outstanding control of anthracnose diseases. It works successfully, too, on early blight, but isn't as effective against late blight.

Probably the most widely accepted carbamate family member today is nabam, sodium salt of ethylene-bis dithiocarbamate. Nabam is marketed as a 19% solution. In spray tanks, farmers add zinc sulfate to nabam, thus producing the zinc salt. If they choose, users may purchase the zinc salt directly, under the generic name zineb. Main uses: in controlling early and late blight of potatoes and tomatoes.

Thiram—tetramethylthiuram disulfide—rounds out the carbamate line of fungicides marketed by the pesticides industry. It finds wide application in combating turf diseases, particularly one called "large brown patch." Recently, thiram demand received a boost when the chemical proved itself against apple scab, the most ruinous of all apple diseases. Aside from its fungicidal uses, thiram claims markets as a seed treating agent.

One outstanding fungicide that serves many all-round uses against a wide spectrum of plant diseases is captan (N-trichloromethyl mercapto-4-cyclohexene-1,2-dicarboximide). Admittedly, its main outlet today is in combating fruit diseases. But captan is gaining acceptance as a seed treatment and in controlling diseases of ornamental plants.

Another fungicide currently scoring well—against apple, cherry and peach diseases—is glyodin (2-heptadecyl glyoxalidine acetate). Besides serving as an effective fungicide, glyodin has a unique advantage over other fungicides: it serves as a miticide when applied in spray schedules.

Moreover, glyodin's wetting properties continue to spark its use as a spreader-sticker for improving fungicide or insecticide coverage of hard-to-wet foliage.

Eradicants: A number of eradicant-type foliage fungicides are now coming into the limelight. Dichlone and the phenyl mercury compounds are the most active eradicant groups. These particular materials are currently available as a number of trademarked products such as Puratized, Phix, Coromerc and Tag.

Promising Fungicides: Compared with the crowded lists of promising insecticides, miticides and weed killers, there are few promising foliage fungicides. Worth watching: Kemate and Thioneb.

Kemate (2,4-dichloro-6-[*o*-chloroaniline] triazine; Chemagro) is commercially available as a 50% wettable powder, shows promise in controlling diseases of vegetables, fruits and ornamental plantings.

Thioneb (a polyethylenethiuram sulfide; Naugatuck Chemical Division, U.S. Rubber) is also being made available (for experimental purposes) as a 50% wettable powder to be used

C W Reports

on fruits, vegetables, ornamentals, and as a seed treatment chemical.

A listing of inorganic and organic foliage fungicides, producers, manufacturing processes, sales data and recommended uses is included in the tables on pp. 74 through 81.

Seed Treatments

In recent years sales of seed treatments have grown to substantial volume. Reason: of all agricultural chemical groups, seed treating chemicals have probably paid off best for farmers. Example: a corn grower can parlay $1 invested in seed treating products into $125 worth of extra corn bushels. Peas, beans and spinach also return similar dividends when seeds are properly treated.

So it's no surprise to the industry that farmers readily accept these new pesticide chemicals. Since 1940, when chloronil was first introduced for pea-seed treatment, sales volume has grown steadily. Chloronil was quickly adopted, replaced mercury and copper compounds—products with serious shortcomings as seed treating agents.

Other organics closely followed chloronil—dichlone, thiram, zinc trichlorphenate, a series of phenyl mercuries, and a most recent addition to the list, captan.

Thiram is one of the principal seed treating chemicals in use today on corn (informed sources claim 100% of Iowa's seed corn now is treated). Zinc trichlorophenate, sold under the tradename Dow 9-B Seed Protectant,

Continued on p. 98

IN THIS EXTENSIVE pesticide industry survey, CHEMICAL WEEK gives its chemical process industry readers a detailed look at the status and potential of the fast-growing pesticide branch of U.S. agricultural chemical manufacture.

Statistics and market estimates were obtained from so many sources that it would be impractical to give complete references. Marketing and production figures, in many cases, are averages or approximations, offered by the author as "order of magnitude" impressions rather than as absolute values. For exact data—especially on pesticide toxicology and end-use applications—CHEMICAL WEEK readers are referred to specific literature on the subject and to manufacturers of the chemicals.

In compiling this inclusive report, considerable time was spent in checking accuracy of the data appearing in the text, charts and tables. In a report of this scope, however, it is impossible to guarantee perfection. Thus, neither CHEMICAL WEEK, nor Carl Fischer, nor Carbide and Carbon Chemicals Co. can take responsibility for the completeness and accuracy of the statistics and data.

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Leading Pesticide Producers

Company	Abbreviation	Address
Abbott Laboratories	Abbott	14th St. & Sheridan Rd., North Chicago, Ill.
Allied Chemical & Dye	Allied Chem.	40 Rector St., New York 6, N.Y.
American Agricultural Chemical	Amer. Ag.	50 Church St., New York 7, N.Y.
American Chemical Paint	ACP	Ambler, Pa.
American Cyanamid Ind. Chem. Div.	Amer. Cy.	30 Rockefeller Plaza, New York 21, N.Y.
American Potash & Chemical	Amer. Pot.	3030 W. 6th St., Los Angeles 54, Calif.
Arapahoe Chemicals	Arapahoe	2800 Pearl St., Boulder, Colo.
J. T. Baker Chemical	Baker	Phillipsburg, N.J.
Benzol Products	Benzol	237 South St., Newark 5, N.J.
B&G Co.	B&G	4725 Rising Sun Ave., Philadelphia 20, Pa.
Berkshire Chemical	Berkshire Chem.	420 Lexington Ave., New York 17, N.Y.
Brothers Chemical	Brothers	575 Forest St., Orange, N.J.
California Spray-Chemical	Calspray	Lucas & Ortho Way, Richmond, Calif.
Carbide and Carbon Chemicals Division	Carbide	30 E. 42nd St., New York 17, N.Y.
Central Chemical Corp of Maryland	Central	49 N. Jonathan St., Hagerstown, Md.
Chemagro	Chemagro	101 Park Ave., New York 17, N.Y.
Chemical Insecticides Corp.	Chem. Insecticides	129 Montague St., Brooklyn 1, N.Y.
Chemley Products	Chemley	14 E. Jackson Blvd., Chicago 4, Ill.
Chipman Chemical	Chipman	P.O. Box 309, Bound Brook, N.J.
W. A. Cleary	Cleary	P.O. Box 749, New Brunswick, N.J.
Commercial Solvents	Comm. Solv.	260 Madison Ave., New York 16, N.Y.
Delta Chemical Works	Delta Chem.	23 W. 60th St., New York 23, N.Y.
Diamond Alkali	Dia. Alk.	300 Union Commerce Bldg., Cleveland
Distillation Products Industries Div., Eastman	Dist. Prod.	755 Ridge Rd., W., Rochester 3, N.Y.
Dow Chemical	Dow	Midland, Mich.
E.I. du Pont de Nemours	Du Pont	10th & Market Sts., Wilmington 98, Del.
Fairfield Chemical Division, FMC	Fairfield	420 Lexington Ave., New York 17, N.Y.
Fairmount Chemical Co.	Fairmount	600 Ferry St., Newark 5, N.J.
Food Machinery & Chemical	Food Mach.	161 E. 42nd St., New York 17, N.Y.
Frontier Chemical	Frontier	321 W. Douglas, Wichita, Kan.
Gallard-Schlesinger Chemicides	Gallard-Schlesinger	37-11 29th St., Long Island City 1, N.Y.
Gallowhur Chemical	Gallowhur	801 2nd Ave., New York 17, N.Y.
Geigy Industrial Chemicals, Div., Geigy	Geigy	89 Barclay St., New York 8, N.Y.
General Chemical Division, Allied	Gen. Chem.	40 Rector St., New York 6, N.Y.
B. F. Goodrich Chemical	Goodrich	2060 E. 9th St., Cleveland 15, O.
Hercules Powder	Hercules	978 Market St., Wilmington 99, Del.
Heyden Chemical	Heyden	342 Madison Ave., New York 17, N.Y.
Hooker Electrochemical	Hooker	4715 Buffalo Ave., Niagara Falls, N.Y.
Irvington Varnish & Insulator Div., 3M	Irvington	6 Argyle Terrace, Irvington 11, N.J.
Jefferson Chemical Co.	Jefferson	260 Madison Ave., New York 16, N.Y.

Kolker Chemical	Kolker	600 Doremus Ave., Newark 5, N.J.
Koppers Co.	Koppers	Koppers Bldg., Pittsburgh 19, Pa.
Larvacide Products	Larvacide	117 Liberty St., New York, N.Y.
Lebanon Chemical	Lebanon	P.O. Box 532, Lebanon, Pa.
Los Angeles Chemical	L.A. Chem.	1960 Sante Fe Ave., Los Angeles 21, Calif.
Mallinckrodt Chemical Works	Mallinckrodt	Second & Mallinckrodt Sts., St. Louis 7, Mo.
Matheson Coleman & Bell Division	Math. Coleman	932 Paterson Plank Rd., E. Rutherford, N.J.
McLaughlin Gormley King	MGK	1715 S.E. 5th St., Minneapolis 14, Minn.
Merck	Merck	Lincoln Ave., Rahway, N.J.
Michigan Chemical	Mich. Chem.	500 N. Bankson St., St. Louis, Mich.
Miller Chemical & Fertilizer	Miller	2226 N. Howard St., Baltimore 18, Md.
Monsanto Chemical	Monsanto	710 N. 12th Blvd., St. Louis 1, Mo.
Montrose Chemical	Montrose	120 Lister Ave., Newark 5, N.J.
Mountain Copper	Mountain	230 California St., San Francisco 11, Calif.
Naugatuck Chemical Div., U.S. Rubber	Naugatuck	203 Elm St., Naugatuck, Conn.
New York Quinine & Chemical Works	N.Y. Quinine	50 Church St., New York 7, N.Y.
Niagara Chemical Div., FMC	Niagara	100 Niagara St., Middleport, N.Y.
Olin Mathieson Chemical	Olin Math.	Baltimore 3, Md.
Pacific Coast Borax	Pacific Coast	630 Shatto Pl., Los Angeles 5, Calif.
S. B. Penick	Penick	50 Church St., New York 7, N.Y.
Pennsylvania Salt Mfg.	Penn Salt	3 Penn Center Plaza, Philadelphia 2, Pa.
Phelps-Dodge Refining	Phelps-Dodge	40 Wall St., New York 5, N.Y.
Pittsburgh Coke & Chemical	Pitts. Coke	1905 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Plate Glass	Pitts Pl.	1 Gateway Center, Pittsburgh 22, Pa.
John Powell, Division, Olin Mathieson	Powell	1 Park Ave., New York 16, N.Y.
Prentiss Drug & Chemical	Prentiss	110 William St., New York 38, N.Y.
Reilly Tar & Chemical	Reilly	1615 Merchant Bank Bldg., Indianapolis
Ringwood Chemical	Ringwood	120 S. LaSalle St., Chicago 3, Ill.
Rohm & Haas	Rohm & Haas	712 Locust St., Philadelphia 5, Pa.
Shell Chemical	Shell	380 Madison Ave., New York 17, N.Y.
Sherwin-Williams	Sherwin-Wms.	100 Park Ave., New York 17, N.Y.
Standard Agricultural Chemicals	Standard Ag.	1301 Jefferson St., Hoboken, N.J.
Stauffer Chemical	Stauffer	380 Madison Ave., New York 17, N.Y.
Tennessee	Tennessee	619 Grant Bldg., Atlanta 1, Ga.
United States Industrial Chemical	USI	99 Park Ave., New York 16, N.Y.
Velsicol	Velsicol	330 E. Grand Ave., Chicago 11, Ill.
Virginia-Carolina Chemical	Virginia-Carolina	401 E. Main St., Richmond 8, Va.
Winthrop-Stearns	Winthrop-Stearns	1450 Broadway, New York 18, N.Y.
Woolfolk Chemical Works	Woolfolk	East Main St., Fort Valley, Ga.
Wyandotte Chemical	Wyandotte	Wyandotte, Mich.

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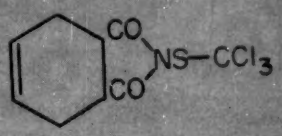
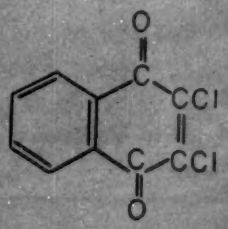
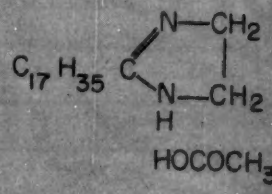
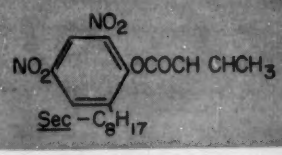
NOTES ABOUT THE TABLES

● The following 22 pages of tables represent a careful collation of pesticide industry data from many sources. In some instances, figures are those of the author.

● Abbreviations used under the heading **Principal Formulations: WP**—wettable powder; **EC**—emulsifiable concentrate; **D**—dust; **S**—solution.

● **Annual Sales, Sales Price** and **Total Sales Value** columns represent available data. In many instances, data could not be obtained, or the author was ad-

ORGANIC FOLIAGE

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
captan	Calspray "Orthocide" Stauffer	N-trichloromethyl mercapto-4-cyclohexene-1 ,2-dicarboximide		white crystalline solid m.p. 172 C
dichlone	Naugatuck "Phygon"	2 ,3-dichloro-1 ,4-naphthoquinone		yellow crystals m.p. 193 C
ferbam	Du Pont "Fermate" Berkshire Chem. "Ferberk"	ferric dimethyl dithiocarbamate	$[(CH_3)_2N \cdot CS \cdot S]_3Fe$	black powder melting with decomposition at 180 C
glyodin	Carbide "Crag"	2-heptadecyl glyoxalidine acetate		waxy solid m.p. 94 C (free base)
"Karathane"	Rohm & Haas "Karathane"	dinitro (1-methyl heptyl) phenyl crotonate		viscous dark liquid

vised by chemical companies that the data was confidential. **Sales Prices** are on a contained basis computed from a principal ready-to-use formulation available at retail. Due to differences in formulations, freight rates, and many other variables, these prices are, at best, rough guides.

● **Acute oral toxicity** figures indicate the relative acute oral toxicity of pesticide chemicals to laboratory animals. "LD_{50}," of course, refers to the number of milligrams of chemical per kilogram of body weight of laboratory animals tested (usually rats), a single dose of which killed half of the animals tested. The higher the LD_{50} value, the lower the pesticide toxicity.

● Two points about toxicity must be emphasized: (1) expert judgment is needed to translate acute oral toxicity figures into meaningful data for humans; (2) acute oral toxicity relates to handling hazards, not to long-term toxicity. Therefore, it has little bearing on safety of pesticide residues.

● **Major End-Uses** listed in the tables represent common knowledge, advice from manufacturers or, in some instances, the author's observations.

FUNGICIDES (I)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of imide, formed by action of ammonia on tetrahydrophthalic anhydride, with perchloromethyl mercaptan	50% WP 7.5% D	—	1.20	—	15,000	apples, peaches, pears cherries, citrus, certain small fruits and vegetables seed treatment ornamentals
chlorination of 1,4-amino-naphthaline sulfonic acid	50% WP 50% D	—	2.86	—	1,500	celery, tomatoes, apples, peaches, cherries seed treatment
reaction of sodium dimethyl dithiocarbamate with ferric compounds	76% WP 10% D	—	0.66	—	> 11,000	almonds apples, cherries, pears, certain small fruits and vegetables tobacco seed beds greenhouse and ornamental plants
removal of water from N-2-aminoethyl stearamide; acetate salt prepared with acetic acid	34% S	—	1.50	—	3,720	apples, pears, cherries ornamentals
—	25% WP	—	6.00	—	714	apples nursery stock, ornamentals, trees, shrubs, roses

* Approximate figures.

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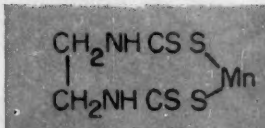
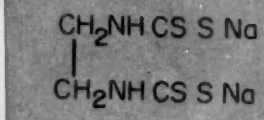
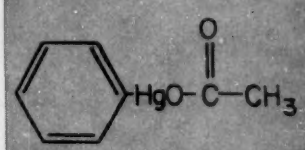
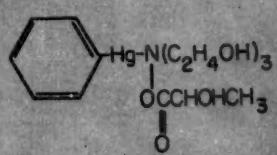
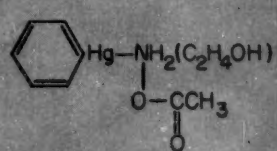
ORGANIC FOLIAGE

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
maneb	Du Pont "Manzate" Rohm & Haas "Dithane M-22"	manganese ethylene bis-dithiocarbamate		yellow crystalline solid slightly soluble in water
nabam	Rohm & Haas "Dithane D-14" Du Pont "Parzate" Liquid Chem. Insecticides "Chem-Bam"	disodium ethylene bis-dithiocarbamate		colorless crystals water-soluble
PMA	Cleary Gallowhur "SC-110" Chemley "Phix"	phenyl mercuric acetate		m.p. 148-150 C
"Puratized" Agric. Spray	Gallowhur "Puratized"	phenylmercuri - triethanolammonium lactate		white crystalline solid m.p. 126 C soluble in water
"Puratized" Apple Spray	Gallowhur "Puratized"	phenylmercuri - monoethanolammonium acetate		white crystalline solid soluble in water

FUNGICIDES (II)

Manufacturing Process	Principal Formulations	Annual Sales* ($1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of sodium ethylene bis-dithiocarbamate with a water-soluble manganese salt	70% WP	—	0.89	—	7,500	almonds, potatoes celery, tomatoes, cucurbits and certain other vegetables and fruits
reaction of ethylene diamine and carbon bisulfide in presence of caustic soda	19% S	—	0.80	—	395	potatoes, tomatoes, corn, celery, cole crops, beans, cucurbits, carrots, onions, tobacco, grapes, pecans, certain other fruits and vegetables ornamentals
reaction of mercuric acetate with benzene in glacial acetic acid	10% S	—	20.10	—	—	apples and turf control of crabgrass, industrial applications for fungal and bacterial control
reaction product of phenyl mercuric acetate with triethanolamine in presence of lactic acid	7.5% S	—	17.30	—	30	apples, pears, certain other fruits lillies, gladiolus, other ornamentals potato and sweet potato seed pieces turf
reaction product of phenyl mercuric acetate with monoethanolamine	11.5% S	—	17.50	—	—	apples shade trees and other ornamentals

* Approximate figures.

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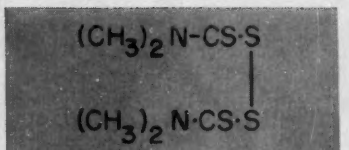
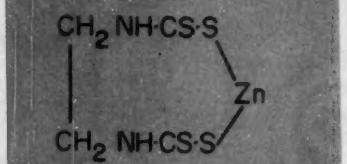
ORGANIC FOLIAGE

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
thiram	Du Pont "Thylate" "Arasan" "Tersan"	tetramethyl thiuram disulfide		yellowish crystals m.p. 155-156 C
zineb	Du Pont "Parzate" Berkshire Chem. "Zirberk"	zinc ethylene bis-dithiocarbamate		light-colored powder
ziram	Du Pont "Zerlate" Berkshire Chem. "Zirberk"	zinc dimethyl dithiocarbamate	$[(CH_3)_2N \cdot CS \cdot S]_2Zn$	white powder m.p. 246 C

INORGANIC FOLI

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
Bordeaux mixture	tank-mixed on the farm	mixture of copper sulfate and hydrated lime	precise structure unknown	light blue gelatinous precipitate suspended in water
copper oxychloride	Du Pont "Copper A" Food M.ch. "COCS" Harshaw	basic copper chloride	$3\,Cu(OH)_2 \cdot CuCl_2$	green to bluish-green powder

FUNGICIDES (III)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
oxidation of sodium dimethyl dithiocarbamate by hydrogen peroxide	75% WP 50% D	—	—	—	865	apples seed treatment turf
reaction of disodium ethylene bis-dithiocarbamate with zinc sulfate	65% WP 6% D	—	1.14	—	>5,200	wheat tomatoes, celery, beans, cole crops, cucurbits, apples, peaches, pears, cherries, onions and certain other fruits and vegetables ornamentals
reaction of sodium dimethyl dithiocarbamate with zinc sulfate	76% WP	**617**	0.93	**660**	1,400	almonds, pecans tomatoes, beans, cole crops, cucurbits, certain other fruits and vegetables

AGE FUNGICIDES (I)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
by the mixture of aqueous copper sulfate solution with a suspension of calcium hydroxide	8:8:100 (8 lb. blue-stone, 8 lb. hydrated lime to 100 gal. of water)	see "copper sulfate"	—	—	—	potatoes, tomatoes, cherries, cucurbits, bananas
action of air on scrap copper in cupric chloride - sodium chloride solutions	WP	—	—	—	—	potatoes, tomatoes, cherries

* Approximate figures.

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INORGANIC FOLI

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
copper sulfate (blue-stone)	Phelps-Dodge "Triangle" Tennessee	copper sulfate	Cu_2SO_4	blue crystals soluble in water
copper zinc chromate	Carbide "Crag"	copper, zinc chromate complex	$15CuO \cdot 10ZnO \cdot 6CrO_3 \cdot 25H_2O$	green-yellow powder
cuprous oxide	Rohm & Haas "Yellow Cuprocide"	cuprous oxide	Cu_2O	yellow to red amorphous powder
lime sulfur	Central Dow Miller	aqueous solution of calcium polysulfides and calcium thiosulfate	not known	deep orange malodorous liquid sp. g. not less than 1.28
sulfur	Stauffer Dow Food Mach. Olin Math. Pitts. Plate	sulfur	S	fine yellow powder m.p. 115 C
tribasic copper sulfate	Phelps-Dodge Irvington Mountain	tribasic copper sulfate	not known precisely	—

AGE FUNGICIDES (II)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of sulfuric acid on copper or copper oxide	98% hexa-hydrate	**108,000**	0.18	**19,440**	300	used for the preparation of Bordeaux mixture on the farm or for the manufacture of other copper-containing fungicides
reaction product of copper sulfate, zinc oxide and chromic acid	95% WP	—	0.44	—	616	potatoes, tomatoes, cucurbits, peanuts and citrus
precipitation of copper salts by alkalis in the presence of reducing agents	50% WP	—	—	—	—	cherries, potatoes, tomatoes seed treatment
reaction of sulfur in hydrated lime suspension, under pressure and in absence of air	100%	**11,000**	0.03	**330**	—	apples, peaches, pears
grinding of sulfur or obtained as a by-product in the manufacture of fuel gas from coal	98.5% WP 70% paste 50% paste 90% D	**150,000**	0.07	**10,500**	—	apples, other fruits mites of citrus, cotton
—	WP	—	0.38	—	—	potatoes, tomatoes, cucurbits

* Approximate figures.

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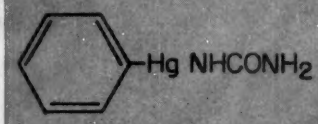
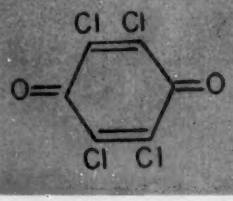
SEED TREATMENT

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
"Agrox"	Chipman "Agrox"	phenyl mercury urea		
basic copper carbonate	Tennessee	cupric carbonate	$Cu(OH)_2 \cdot CuCO_3$	green amorphous powder
bichloride of mercury	Mallinckrodt	mercuric chloride	$HgCl_2$	white crystals m.p. 277 C
calomel	Mallinckrodt "Calogreen"	mercurous chloride	$HgCl$	white powder sublimes at 400-500 C
captan	(see table on "Organic Foliage Fungicides")			
chloranil	Naugatuck "Spergon"	tetrachloro-*p*-benzoquinone		m.p. 290 C yellow crystals

FUNGICIDES (I)

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
	6.70% powder		cotton, corn, rice and wheat
precipitation of copper sulfate solution with soda ash	94% powder		cereals
chlorination of mercury			fusarium of wheat
chlorination of mercury	4% D		cabbage, onions, celery
oxidation of trichlorophenol with chromic acid	48% WP 95% slurry treater	4	small grains, vegetables, especially peas and beans

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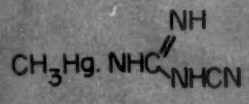
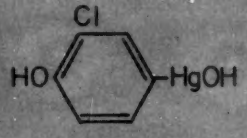
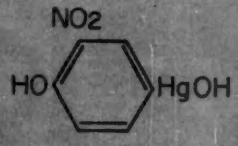
SEED TREATMENT

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
ethyl mercuric chloride	Du Pont "Ceresan"	ethyl mercuric chloride	C_2H_5HgCl	silvery iridescent crystals m.p. 192.5 C
"Panogen"	Panogen, Inc. "Panogen"	methyl mercuric dicyandiamide		m.p. 156 C
PMA		phenyl mercuric acetate	(see table on "Organic Foliage Fungicides")	
"Semesan"	Du Pont "Semesan"	hydroxymercurichlorophenol		insoluble in water
"Semesan Bel"	Du Pont "Semesan Bel"	hydroxymercurichlorophenol 3.2% hydroxymercurinitrophenol 12%		insoluble in water
thiram	Du Pont "Arasan"	(see table on "Organic Foliage Fungicides")		

FUNGICIDES (II)

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction between zinc diethyl and mercuric chloride	2%	—	cotton, peas, flax
reaction methylmercuric hydroxide and dicyandiamide	2.2% S 6.3% S	—	small grains
heating o-chlorophenol with mercuric oxide	30%	—	seeds, bulbs
—	(see under "Chemical Name")	—	vegetable and flower seeds, potatoes

C W Report

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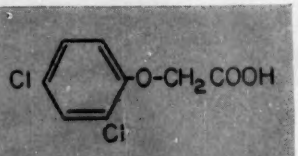
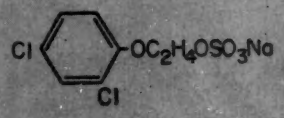
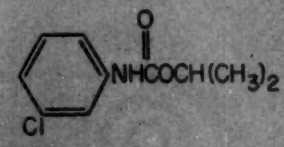
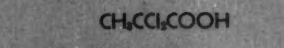
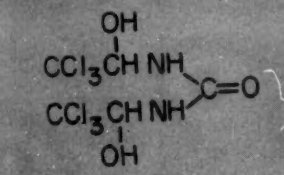
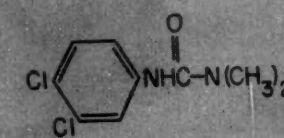
FIELD, HORTICULTURAL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
2,4-D	Dia. Alk. Dow Monsanto	2,4-dichlorophenoxyacetic acid		white solid m.p. 138 C
"Sesone" (SES)	Carbide "Crag" "Sesone"	sodium 2 - (2,4 - dichlorophenoxy) ethyl sulfate		white crystals m.p. 170 C soluble in water
CIPC	Pitts. Plate	isopropyl - N - (3 - chlorophenyl) carbamate		liquid soluble in org. solvents less volatile than IPC
dalapon	Dow	2,2-dichloropropionic acid		tan water-soluble powder
DCU	Carbide "Crag"	1,3 - bis(2,2,2 - trichloro - 1 - hydroxyethyl) urea		white crystalline powder m.p. 191 C with decomposition
diuron	Du Pont "Karmex DW" "Telvar DW"	3 - (3,4 - dichlorophenyl) - 1,1 - dimethylurea		—

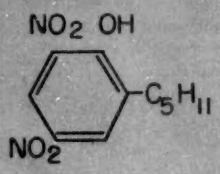
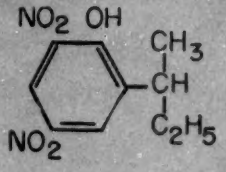
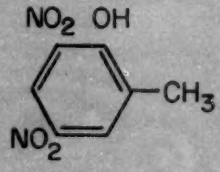
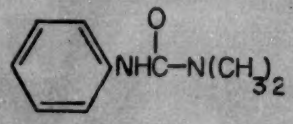
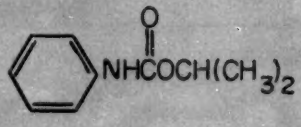
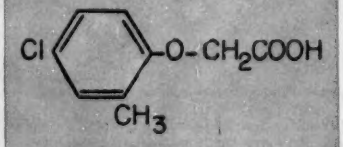
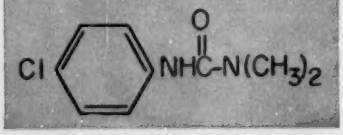
CIDES AND FORAGE CROPS (I)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of monochloroacetic acid with sodium - 2,4 - di - chlorophenate	solutions of esters and amine salts containing 4 lb. acid per gallon	**34,070**	0.84	**28,600**	500	control of weeds in grains with 2,4,5-T for brush control pastures and turf
sulfation of 2,4-dichlorophenoxyethanol	90% water sol. powder	—	2.00	—	1,000	asparagus, strawberries peanuts, potatoes, nursery stock
reacting metachloroaniline with isopropylchloroformate	4 lb./gal EC	—	2.62	—	5,000	cotton onions, cole crops
chlorination of propionic acid	85% sodium salt	—	—	—	—	control of grasses in railroad ballast, industrial areas, drainage ditches and in sugar cane
reaction between chloral and urea	73% WP	—	1.66	—	6,680	control of grass weeds in sugar beets
reaction 3, 4 - dichlorophenylisocyanate with dimethylamine	80% WP 28% liquid	—	—	—	3,400	nonselective weed and brush control

* Approximate figures.

C W Report

HERB FIELD, HORTICULTURAL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
DNAP	Standard Ag.	4,6 - dinitro - *o* - sec - amyl phenol		—
DNBP (formerly DNOSBP)	Dow Standard Ag.	4,6 - dinitro - *o* - sec - butyl - phenol		reddish-brown liquid m.p. approx. 28 C
DNC (formerly DNOC)	Standard Ag. "Sinox"	4,6-dinitro-o-cresol		yellow crystals m.p. 85.8 C
fenuron	Du Pont	3-(phenyl)-1,1-dimethyl-urea		white crystalline solid m.p. 127-129 C sol. in water 2,900 p.p.m.
IPC	Pitts. Plate	isopropyl-N-phenylcarbamate		white crystals m.p. 90 C
MCPA	Monsanto Dow	2,methyl - 4 - chlorophenoxyacetic acid		light brown solid m.p. 99-107 C
monuron	Du Pont "Karmex W" "Telvar W"	3 - (*p* - chlorophenyl) - 1,1 - di - methylurea		grayish - white crystalline solid m.p. approx. 170 C

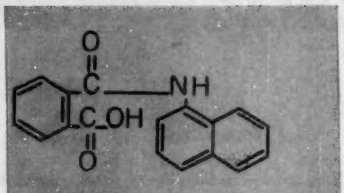
ICIDES AND FORAGE CROPS (II)

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/Lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
itration of *o*-sec-amyl phenol	75% S	—	—	—	—	nonselective, kills potato tops alfalfa defoliant
itration of *o*-sec-butyl phenol . btained from butylene and henol	5 lb/gal EC	—	—	—	40	in seed crop of flax, legumes
itration of *o*-cresol	—	—	—	—	26	grains, flax and peas
eaction of phenyl isocyanate with dimethylamine	80% WP	—	—	—	7,500	promising for brush control and deep-rooted perennials in crop land
ondensing phenyl isocyanate with isopropanol	2 lb/gal EC	—	0.80	—	3,000	sugar beets and peas
eaction of monochloracetic cid with sodium-4-chloro-o-resol	solution of amine salt containing 2 lb. acid per gallon	—	2.50	—	—	flax, small grains, rice,-legumes
eaction of *p*-chlorophenyl-socyanate with dimethylam-ne	80% WP	—	—	—	3,500	asparagus, citrus, grapes, pineapple, sugar cane, onions, cottonseed, spinach

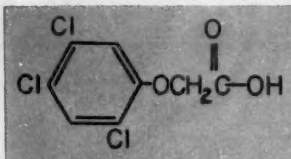
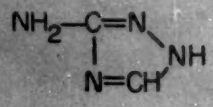
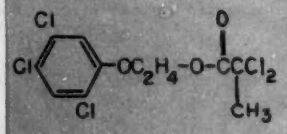
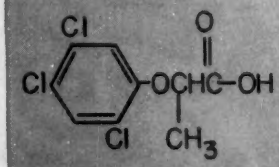
* Approximate figures.

C W Report

HERBI
FIELD, HORTICULTURAL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
NPA	Naugatuck "Alanap-1"	N-1-naphthyl phthalamic acid		crystalline solid m.p. 185 C
TCA	Dow Hooker Monsanto	trichloroacetic acid	Cl_3CCOOH	colorless crystal m.p. 57.5 C b.p. 197.5 C

BRUSH

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
2,4,5-T	Dia. Alk. Dow Monsanto	2,4,5-trichlorophenoxyacetic acid		white solid m.p. 154-155 C
ammonium sulfamate	Du Pont "Ammate"	ammonium sulfamate	$NH_4SO_3NH_2$	large crystals m.p. 125 C soluble in water
ATA	ACP Amer. Cy.	3-amino-1,2,4-triazole		white crystals m.p. 153 C
erbon	Dow "Baron"	2-(2,4,5-trichlorophenoxy) ethyl-2,2-dichloropropionate		—
silvex	Dow "Kuron"	2-(2,4,5-trichlorophenoxy) propionic acid		dark-colored liquid

CIDES AND FORAGE CROPS (III)

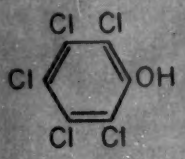
Manufacturing Process	Principal Formulations	Annual Sales* ($1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of phthalic anhydride with 1-naphthylamine	90% WP	—	2.90	—	8,200	cucurbits
oxidation of chloral with nitric acid	90% sodium salt	**6,000**	0.37	**2,200**	—	alfalfa, sugar beets, sugar cane, crucifers nonselective control of grasses

KILLERS

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of sodium 2,4,5-trichlorophenate with monochloroacetic acid	ester formulations containing 4 lbs. acid per gal.	**3,000**	2.28	**6,840**	—	kills brush, small trees, poison ivy, brambles, mesquite
action of fuming sulfuric acid on urea to produce sulfamic acid, which is converted into the ammonium salt	min. 80% ammonium sulfamate	—	0.24	—	—	kills poison ivy, brush and hardwoods
rearrangement of N-formylaminoguanidine with loss of 1 mole of water	50% WP	—	5.00	—	15,000 (to mice)	kills poison ivy, oaks, brush grass and weed control
condense 2,4,5 - trichloro - phenoxy ethanol with dalapon	4 lbs./gal EC	—	—	—	—	control of grass and weeds in noncrop areas
reaction of sodium-2,4,5-trichlorophenate with α-chloropropionic acid	4 lbs. acid per gallon	—	—	—	—	kills post oak, blackjack oak and northern oaks

* Approximate figures.

SOIL

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
borax	Pacific Coast	sodium tetraborate	$Na_2B_4O_7 10H_2O$	white hard crystals m.p. 75 C
fenuron	Du Pont	(see table on "Herbicides")		
PCP	Dow Monsanto "Santophen 20"	pentachlorophenol		dark grayish powder m.p. 187-189 C
sodium arsenite	Pennsalt "Penite" Chem. Insecticides "Chem-Sen. 56"	probably a mixture of sodium ortho-arsenite and sodium metarsenite	Na_3AsO_3 & $NaAsO_2$	reaction of caustic soda with arsenic trioxide
sodium chlorate	Chipman Pennsalt	sodium chlorate	$NaClO_3$	white crystals melts between 248 and 261 C soluble in water

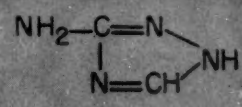
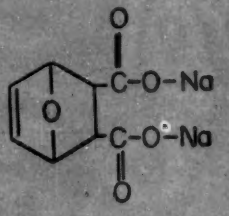
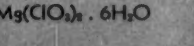
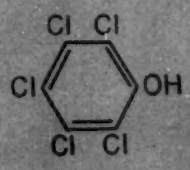
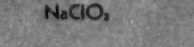
STERILANTS

Manufacturing Process	Principal Formulations	Annual Sales* (1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
occurs naturally in California	mixtures with other weed killers	—	—	—	—	nonselective weed killer
catalytic chlorination of phenol	5% S	**14,000**	0.29	**4,060**	78	weeds in sugar cane defoliant
0 lbs. of As_2O_3 per gallon of aqueous solution	90% powder	—	0.16	—	10	potato-vine killer nonselective weed killer
lectrolysis of aqueous sodium hloride solution	99% powder	**29,000**	0.12	**3,480**	—	weed control in railroad ballast, industrial areas, highways

* Approximate figures.

C W Report

DEFOLIANTS

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
amino triazole	ACP "Weedazol" Amer. Cy. "3 A.T."	3-amino-1,2,4-triazole		m.p. 153 C water - soluble white powder
calcium cyan-amide	Amer. Cy. "Aero"	calcium cyanamide		grayish-black lumps or powder decomposed by water
endothal	Niagara "DF Spray" Pennsalt "Harvest Aid"	disodium - 3,6 - endoxohexahydro-phthalate		m.p. 116 C odorless solid soluble in water
magnes-ium chlorate	Gen. Chem. "E-Z-Off" Dow "Magron" Niagara "MC Defoliant" Calspray "Ortho MC" Pennsalt "De-fol-ate"	magnesium chlorate		white crystals soluble in water
penta-chloro-phenol	Dow Monsanto	pentachlorophenol		dark-gray flakes crystallizes approx. 175 C
sodium chlorate	Chipman Pennsalt	sodium chlorate		white crystals melts between 248 and 261 C soluble in water

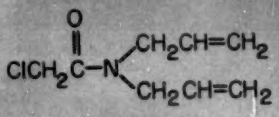
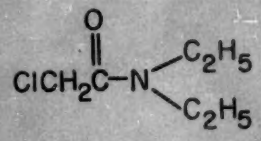
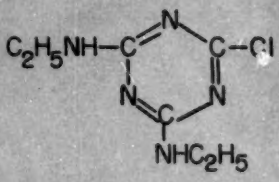
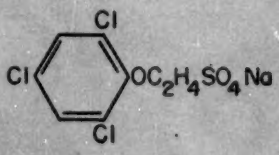
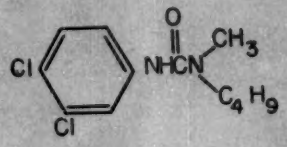
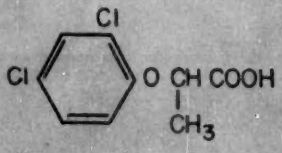
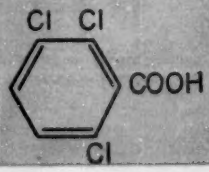
AND DESICCANTS

Manufacturing Process	Principal Formulations	Annual Sales* ($1,000 lb.)	Sales Price* ($/lb.)	Total Sales Value* ($1,000)	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
see "Brush Killers"	90% 50%	—	5.00	—	—	defoliation of cotton
obtained by passing nitrogen over calcium carbide in an electric furnace	57% dust	—	—	—	—	defoliation of cotton
furane reacted with maleic anhydride plus caustic soda to form sodium salt	6.3%	—	3.57	—	—	defoliation and dessication of cotton, beans
electrolysis of aqueous magnesium chloride solution	18.15% 40% 58% 58% 58%	—	—	—	—	defoliation of cotton
catalytic chlorination	40%	—	0.29	—	210	defoliation of cotton
electrolysis of aqueous sodium chloride solution	99% powder	**4,750**	0.12	**570**	—	defoliation of cotton

* Approximate figures.

C W Report

PROMISING WEED

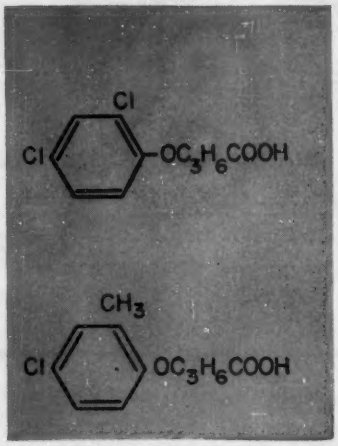
Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
CDAA	Monsanto "Randox"	2-chloro-N,N-diallylacetamide		
CDEA	Monsanto	2-chloro-N,N-diethylacetamide		
CDT	Geigy "Simazin"	2-chloro-4,6-bis-(ethylamino)-S-triazine		white crystalline material m.p. 104 C insoluble in water
"Natrin"	Carbide "Natrin"	sodium 2,4,5-trichlorophenoxyethyl sulfate		white water-soluble powde
neburon	Du Pont	3-(3,4-dichlorophenyl)-1-methyl-1-n-butylurea		
2-(2,4-DP)	Carbide	2-(2,4-dichlorophenoxy) propionic acid		
2,3,6-TBA	Heyden Hooker	2,3,6-trichlorobenzoic acid		

KILLERS (I)

Manufacturing Process	Principal Formulations[1]	Acute Oral Toxicity LD_{50} mg./kg.	Major End-Uses
reaction of diallylamine with chloroacetyl chloride			controls grass weeds
reaction diethylamine and chloroacetyl chloride			controls grass weeds
reaction product of cyanuric chloride and ethyl amine	50% WP	5,000 (to mice)	very promising for pre-emergence control of weeds in corn
sulfation of trichlorophenoxyethanol followed by neutralization with caustic soda	80% Water soluble powder	720	weed and grass control in tomatoes
reaction of 3,4-dichlorophenyl isocyanate with methylbutylamine	18.5% WP 80.0% WP		promising for crabgrass prevention in turf
reaction of α-chloropropionic acid with 2,4-dichlorophenol	4 lb./gal. butoxyethanol ester		appears promising in brush control
chlorination of an alkylbenzene followed by oxidation			pre-emergence weed control in corn

C W Report

PROMISING WEED

Product	Leading Producers and Trademarks	Chemical Name or Definition	Formula	Physical Properties
4-(2,4-DB)	ACP Carbide Dow	4-(2,4-dichlorophenoxy) butyric acid		
4-(MCPB)	ACP Dow	4-(2-methyl-4-chlorophenoxy) butyric acid		

Continued from p. 71

is particularly effective on cotton seed. Organic mercury compounds are finding ready markets among small grain farmers who are replacing their inorganic seed treating chemicals with the organomercurials.

Despite their striking record, seed-treating chemicals have not yet realized their fullest sales potential. Based on 1950 acreage figures (published in 1951 by the U.S. Dept. of Agriculture), there appears to be potential demand for more than 20 million lbs./year of seed-treating fungicides (for the seed of 17 field crops—including the small grains, legumes and potatoes).

Such tonnage quantities have an estimated value of $15-30 million/year. Since this is far above the dollar volume of seed treating products now being marketed, it's obvious that a big market remains to be developed.

Listings of seed treatment fungicides appear in the tables on pp. 82 to 85.

Herbicides

Weeds in 58 major crops cause losses amounting to some $3.2 billion/year. Losses in grazing lands from weeds and brush are estimated at roughly $500 million/year. Weeds in small grains underseeded with legumes cause losses of $75 million/year. Aquatic weeds in drainage and irrigation ditches and canals cause inestimable annual flood losses. Around industrial plants, refineries, tank farms and similar sites, weeds create serious fire hazards.

Controlling this menace to the nation's 7 million acres of vegetable and fruit crops requires much special equipment and hand labor. Weed control costs in such horticultural crops are estimated at $10-100/acre. Still higher costs ($200-300) may be chalked up for crops such as onions, strawberries.

2,4-D: Weed-control research was triggered (in 1945) when the growth regulator designated 2,4-D (2,4-dichlorophenoxyacetic acid) was successfully applied as a weed killer. Prior to 1945, choice of herbicides was limited to relatively few inorganic materials, e.g., arsenicals, borates and chlorates.

During the past decade 2,4-D has gained such widespread use that it now ranks as third-largest pesticide seller on a dollar-volume basis, about sixth in tonnage volume. Current estimates put 2,4-D tonnage sales at 34.1 million lbs./year, worth $28.6 million. Moreover, its rapid growth spurred research leading to the discovery of many related (as well as dissimilar) weed-control agents.

2,4,5-T: One high-ranking herbicide (approximate tonnage sales: 3.0 million lbs./year, valued at $6.8 million) among today's growing list of products is 2,4,5-T. Important end-uses of this chemical include: control of brush, poison ivy, brambles and other woody plants. And 2,4,5-T is frequently combined with 2,4-D to control broad-leaved weeds and woody plants in pastures and range lands, along highway, railroad and power line right of ways, and around industrial and military installations.

Dinitros: As contact weed killers and for selective pre-emergence weed control in a number of crops, dinitro alkylphenols are coming up fast. Dow General (Dow) and Sinox General (Standard Agricultural Chemicals) are two principal dinitro contact products. They're finding ready acceptance as desiccants for seed alfalfa, clover, milo and flax. Two other upcoming dinitros: Premerge and Sinox PE, pre-emergence products used in controlling weeds, especially among lima bean, snap bean, sweet corn and potato crops.

Crag Herbicide-1: Chemically this compound is sodium 2,4-dichlorophenoxyethyl sulfate. When applied to moist soil, it becomes an active herbicidal agent. Crag Herbicide-1 (Carbide) has grown in importance within

KILLERS (II)

Manufacturing Process	Principal Formulations	Acute Oral Toxicity LD_{50} mg./kg.	Promising Uses
reaction of γ-chlorobutyric acid with 2,4-dichlorophenol	4 lb./gal. butoxyethoxypropanol ester 4 lb./gal. diethanolamine salt		selective control of broadleaved weeds in alfalfa, clover, flax, beans and peas
reaction of γ-chlorobutyric acid with *p*-chlorocresol	amine salt		selective control of weeds in legumes

the past few years to become the standard strawberry weed killer. It also is finding widening markets as a pre-emergence weed control chemical on peanut crops, nursery stock and potatoes.

One of its strong points: harmlessness to foliage. Drifting spray is not a menace to such sensitive crops as cotton, tomatoes and grapes.

Urea Herbicides: One of the newer herbicide product groups (developed by Du Pont) has emerged from urea chemistry. Generic names of the commercially important compounds: monuron (*p*-chlorophenyl dimethyl urea); diuron (dichlorophenyl dimethyl urea); fenuron (phenyl dimethyl urea); neburon (dichlorophenyl methyl butyl urea).

At low dosages—say, 1 lb./acre—certain members of this herbicide family are selective pre-emergence weed killers, e.g., on asparagus, sugar cane and cotton crops. At dosages of 40 lbs./acre or more, these same materials are soil sterilants in noncultivated lands, preventing the growth of any vegetation.

Carbamates: Two products in this herbicide group are: IPC (isopropylphenyl carbamate) and CIPC (isopropylchlorophenyl carbamate). CIPC has found greater use as an herbicide than IPC, probably because of its lower volatility. CIPC's major outlets: on cotton, beans, spinach, onions and certain other horticultural crops.

TCA and Dalapon: Because of their success in controlling grass weeds in such crops as sugar beets, sugar cane, alfalfa and flax, two other herbicides —TCA and Dalapon—are growing in importance. The sodium salt of TCA (trichloroacetic acid) is sold in large-volume tonnages today. Dalapon (dichloropropionic acid) is newer than TCA and chemically more potent.

Ammonium Sulfamate: Another compound currently stirring interest among herbicide users is ammonium sulfamate (tradename: Ammate) for use in controlling woody plants, large trees and sprouting stumps.

Arsenicals, Borons, Chlorates: Inorganic compounds such as sodium arsenite, borax and sodium chlorate are highly effective soil sterilants. In use, they prevent growth of all types of vegetation from one to four years, depending on the dosage used. Highly flammable sodium chlorate must be handled with extreme caution. Arsenicals, on the other hand, are highly poisonous and must be used only on areas that are inaccessible to animals. Mixtures of boron with 2,4-D sodium chlorate and the urea herbicides are also currently being marketed for soil sterilant use.

The tables on pp. 86 to 99 include data on herbicides, brush killers, soil sterilants, defoliants, desiccants and promising weed killers.

Herbicide Outlook: As recently as 1953, only one out of every ten acres devoted to field crops was treated for weed control. With farm labor costs hiking steadily, the need to replace the hoe with chemical weed killers is becoming increasingly apparent, especially to farmers.

According to a recent report to Congress, the efforts of one worker in a chemical plant producing 2,4-D equals the toil of 4,000 farm workers armed with hoes. This striking illustration of technological progress symbolizes the chemical industry's growing impact on U.S. agriculture.

Each year, millions of acres of corn, wheat and other grains are treated at extremely low cost. But much room remains for improving coverage.

The estimated total sale of herbicides today—$35 million/year—may well be regarded as only a starting figure where the industry's future is concerned. From all indications, the future of herbicides for field, horticultural and forage crops, for brush killers, for soil sterilants and for defoliant applications seems bright indeed.

Attacking the Perennial Problem

TOXICITY TEST: Part of the high cost of development.

Like other segments of the chemical industry, the agricultural chemicals business has its share of problems. Production capacity in excess of demand is one of the most serious. It's a problem tied to the vagaries of ag chemicals sales trends.

Because of the profound effect of weather on incidence of insects, plant diseases and weeds, forecasting pesticide chemical sales is, more often then not, accurate only to plus or minus 25%. In the cotton-rich South, for example, the best market research and sales forecasts for, say, BHC could go completely astray if weather prevents boll weevil infestation.

Sudden appearance of new pests, on the other hand, creates unexpected pesticide markets at an equally fast clip.

Despite these ups and downs in sales forecasting and production scheduling, pesticide makers must build suitable product inventories before each season begins. If insect infestations don't materialize, or weeds don't flourish, or blights don't occur as predicted, products stand unsold. And hefty inventories cause strains: price weaknesses, consignment selling, loose credit terms.

Some corrective measures to ease undesirable overcapacity are being taken by many pesticide producers. Aggressive firms are diversifying their markets, and effecting realistic cost-appraisal measures.

Increased pesticide demand from abroad is one answer to diversification of markets:

According to the latest U.S. Dept. of Commerce figures, $79.1 million worth of pesticides were exported in 1955, some $16.4 million more than in 1954. Exports, in fact, have become an important part of the pesticide market. DDT is a case in point: approximately 53 million lbs. of it were exported in 1955—42.6% of the total U.S. DDT production.

Here at home, profitable agricultural chemical businesses are being built on sound distribution policies, orderly merchandising and realistic credit policies. In view of the high cost of developing and marketing new pesticides, and recurring problems peculiar to pesticide manufacture, the industry can ill afford any practices that even slightly jeopardize adequate returns on investment.

The pesticide industry's compliance with federal law, commonly known as the Miller amendment (effective July 22, 1956), has been accomplished virtually without a hitch.

Objective of the bill is to regulate amounts of pesticide chemical residues that can legally remain on raw agricultural produce shipped in interstate commerce. Actual amounts of pesticide residues that can legally remain are called "tolerances."

In order to secure product tolerances, pesticide manufacturers must submit to the Food & Drug Administration a petition for each new product. Producing firms have the responsibility of furnishing data on: (1) residual quantities of pesticide that are likely to remain on crops, and (2) residue toxicities.

Compiling such complex data had added a heavy time-and-cost load on manufacturers. Analytical work involved in devising methods of determining minute quantities of residues, then determining residues themselves, may cost upward of $10,000/product. Toxicological studies take additional expenditures. Yet these steps must be taken prior to application for new pesticide product registration.

At the same time a petition is submitted to FDA, a manufacturer must request the U.S. Dept. of Agriculture to certify that his new product is useful in agriculture.

When certification is received, and when FDA determines from available data the residue amount that is without hazard to consumers, a tolerance for the product is set.

Following establishment of a tolerance, it next becomes mandatory that farmers be thoroughly informed by the manufacturer as to how the new pesticide product may be used on crops without overstepping the set tolerances. Here's where product labeling plays an important role. These days, manufacturers' labels are the all-important safeguards of pesticide product use.

Actually, the legislation is the culmination of efforts of many interested groups, including the pesticide industry itself (through the National Agricultural Chemicals Assn.). In helping to draft the measure, the industry aimed at establishing satisfactory ways and means of protecting the public from any hazards relating to pesticide use.

In becoming law, the Miller amendment supersedes all legislation regulating pesticide use. The Food, Drug & Cosmetic Act of 1938 provided for pesticide tolerances but failed to spell out simple procedures for establishing them. The Insecticide, Fungicide and Rodenticide Act of 1947 provided for registration of all pesticides, yet took residues into account only informally.

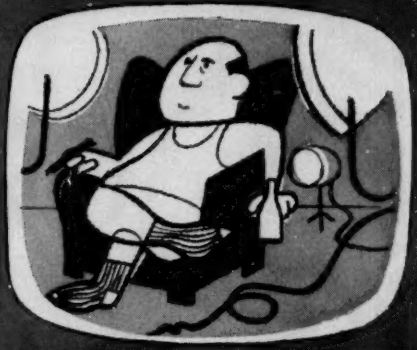
Now the Miller amendment establishes formal and more convenient procedures—albeit costly and time-consuming ones—for setting tolerances. Although many new problems have been triggered by the bill's passage, compliance has been successfully achieved with little disruption of farmers' spray schedules.

a Pfizer TV* family close up

(that may put you in the picture)

*This TV stands for the Tremendous Versatility of Pfizer Chemicals

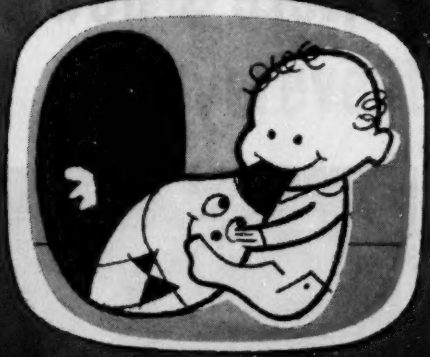
No movie stars, senators, or other famous persons in *this* video visit. Just an ordinary American family like the millions who use products containing Pfizer chemicals.



"FADE IN ON POP" informally guzzling his favorite soft drink. (Its flavor never does a "fade-out" thanks to Pfizer Ascorbic Acid which protects soft drinks against oxidation-loss of flavor and color).

"PAN TO MOM," baking pan in hand and proud to state she *always* looks for word "enriched" on flour she buys. (Pfizer, pioneer manufacturer of vitamins, produces Bi-Cap® one of the first enrichment concentrates).

"DISSOLVE TO JUNIOR" about to dissolve living room carpet with chemical set. (Wants to grow up like Uncle Jim, who does research for Pfizer on pharmaceutical uses of vital antibiotics such as neomycin, bacitracin, polymyxin).



"DOLLY IN TO BABY SUE," whose vinyl plastic doll takes a lot of punishment but never does harm. (It's safe to teethe on. Made with Pfizer Citroflex® A-4, acetyl tributyl citrate, the *nontoxic*, odorless plasticizer).

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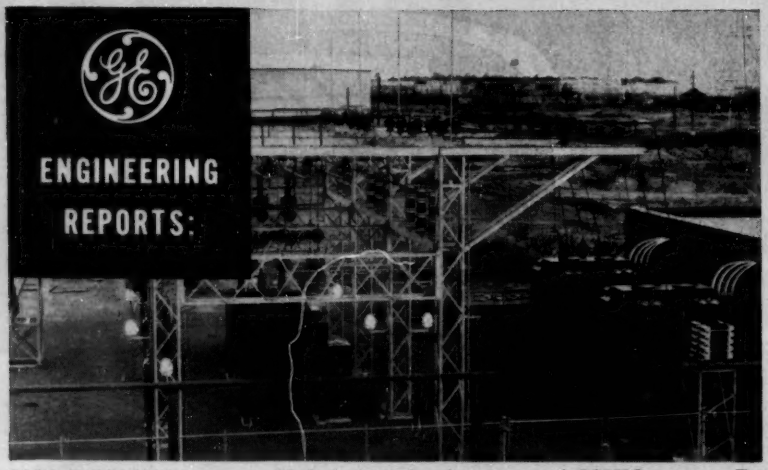
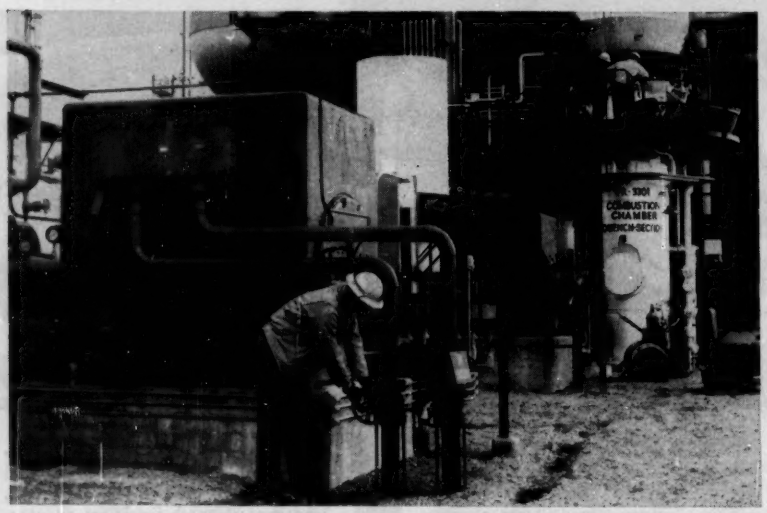
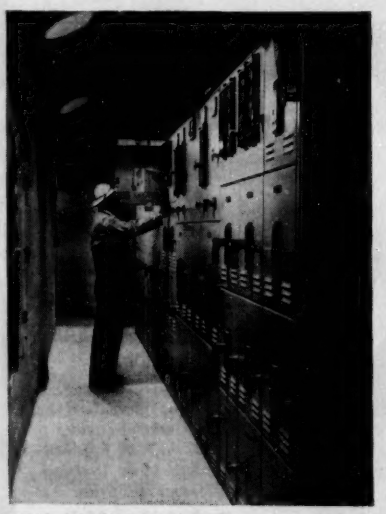


EASY EXPANSION was provided during planning stages of SOHIO system. For example, each of two 11,500-kva power transformers on General Electric package substation, providing 4160 v for plant distribution, can be uprated to 14,394 kva.



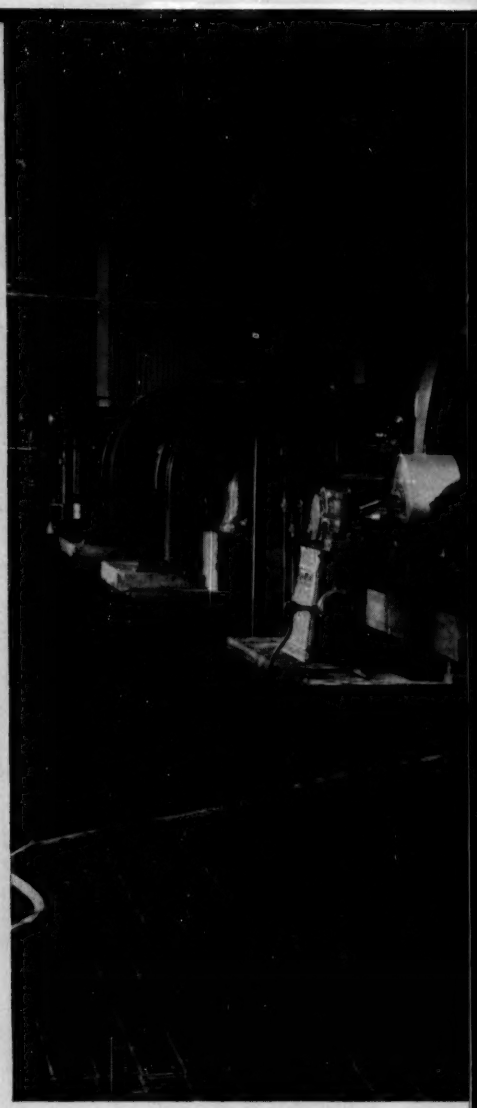
DESIGNED for outdoor process use, two General Electric totally enclosed, inert-gas-filled induction motors, with gas to water heat exchangers, drive centrifugal blowers. Total connected load of the plant's motors approximates 25,000 hp.

OVER CURRENT and short circuit protection is provided for 175 through 1000-hp motors by 4160-v Limitamp* controllers.

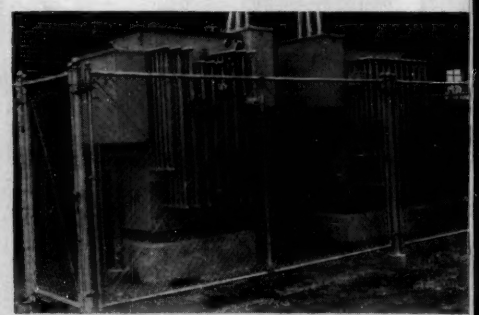


COST SAVING load center system brings higher voltages closer to load. Low voltage switchgear controls auxiliary motors.

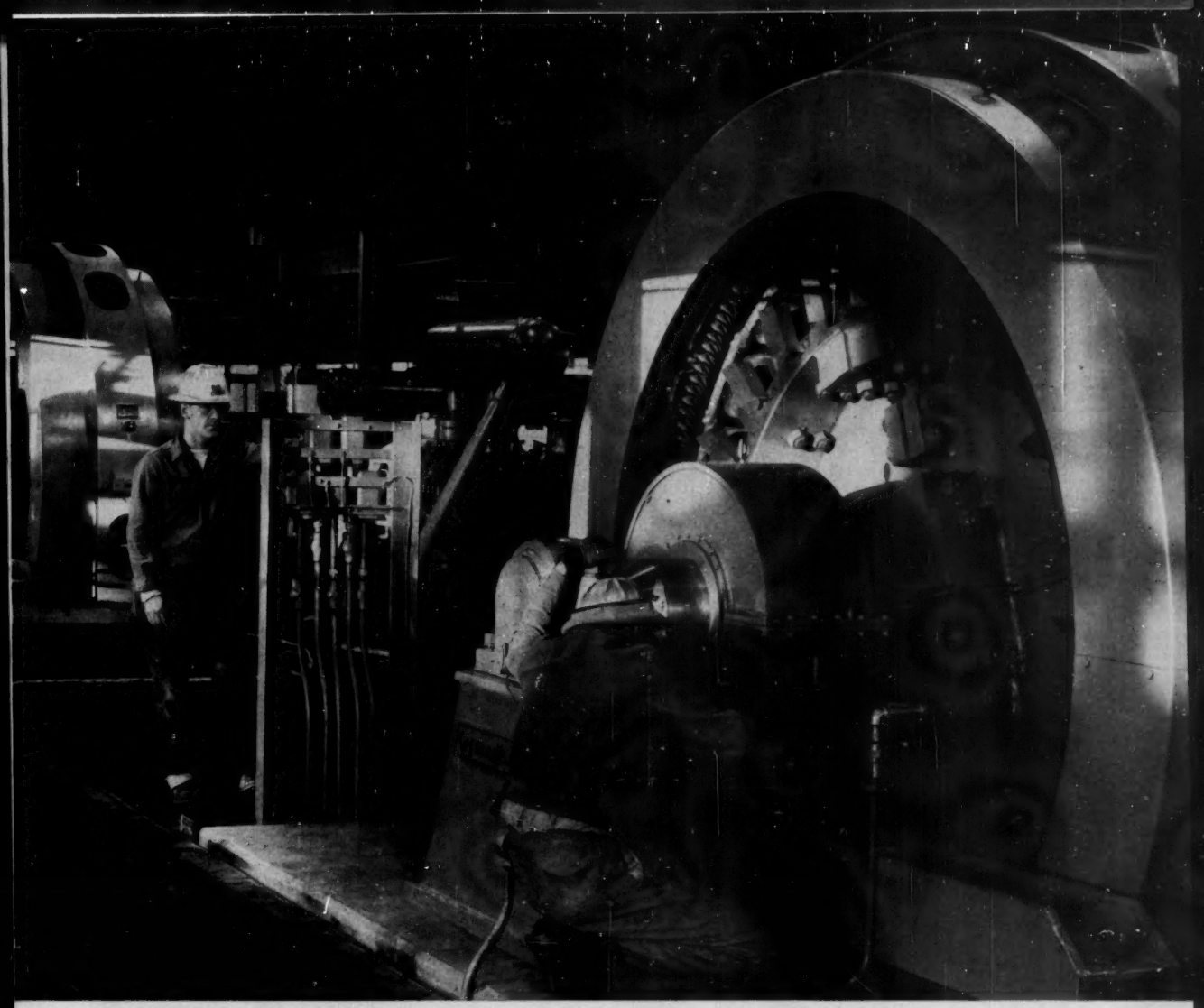
*Reg. trade-mark of General Electric



Here's how system



SYSTEM PROTECTION through neutral grounding covers all voltage levels, including 1000-kva medium transformers.



PRESSURIZED HOUSING encloses sliprings of two 3000-hp General Electric synchronous motors driving synthesis gas compressors. Secondary selective system helps permit almost all motors in the system to have a standby power source.

SOHIO Chemical's engineered electrical helps prevent lost production

General Electric engineered system at new Lima, Ohio, petrochemical plant was planned for reliability, future expansion.

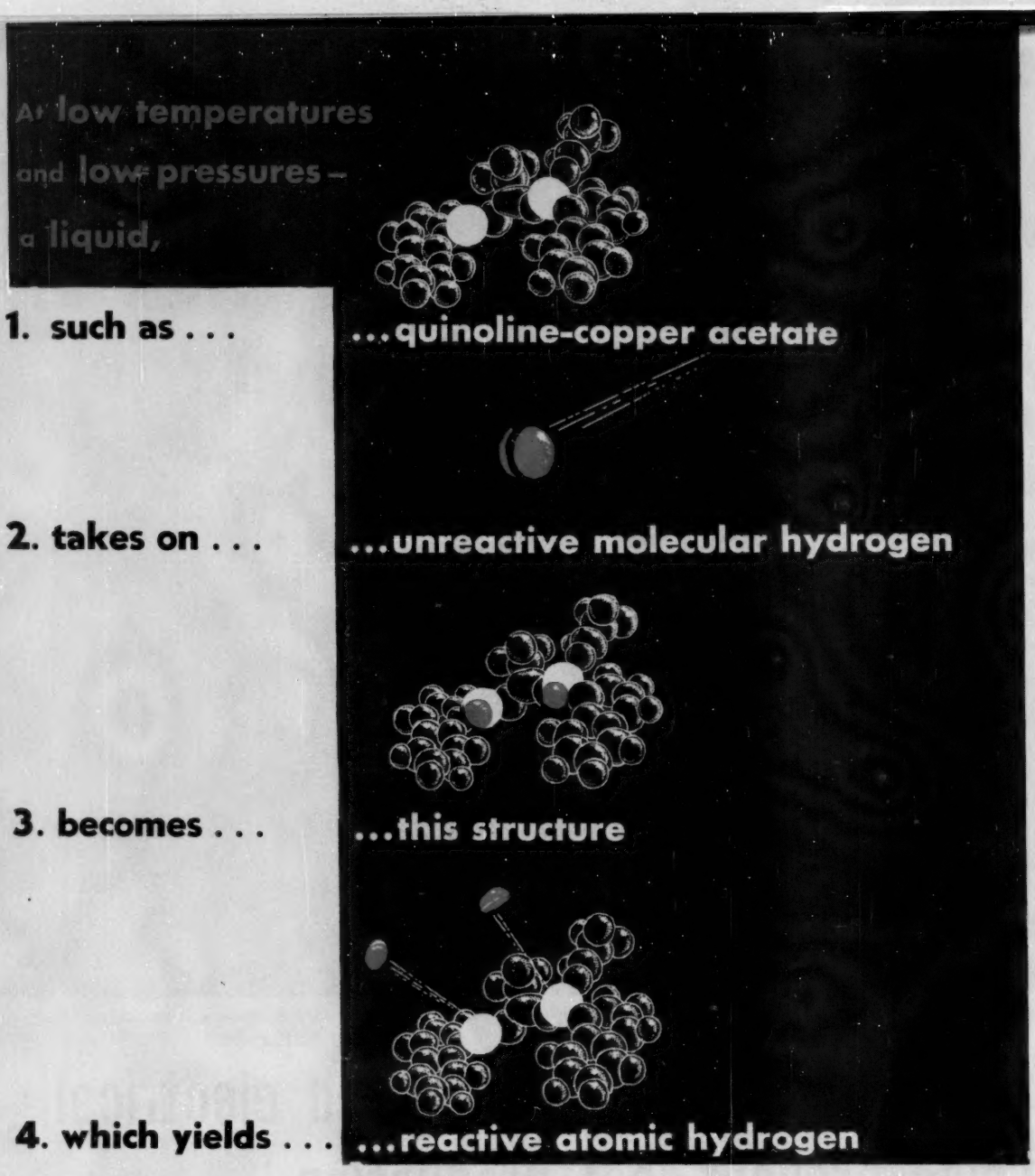
The SOHIO Chemical Company operates their new $17,000,000 petrochemical plant with a General Electric engineered electrical system planned and installed to meet present and future electrical requirements. This modern plant, designed to produce 300 tons of anhydrous ammonia per day, was engineered and constructed by The M. W. Kellogg Co., New York.

2 BASIC REQUIREMENTS were set forth by SOHIO . . . (1) reliability to help guard against lost production and (2) flexibility for future expansion. General Electric engineers worked closely with SOHIO personnel and their consultants to gain these objectives. On these pages are some highlights of the system.

WHEN YOU BUILD, or modernize, take advantage of General Electric quality-engineered electrical equipment and complete engineering services for the chemical industry. Your General Electric Apparatus Sales Representatives at the nearest G-E Apparatus Sales Office will give you complete information. Contact him early in your planning and write for bulletin GED-2244 "Engineering Services" to General Electric Co., Section 681-13, Schenectady, New York.

Engineered Electrical Systems for the Chemical Industry

GENERAL ELECTRIC


At low temperatures
and low pressures –
a liquid,
1. such as . . .
. . . quinoline-copper acetate
2. takes on . . .
. . . unreactive molecular hydrogen
3. becomes . . .
. . . this structure
4. which yields . . .
. . . reactive atomic hydrogen

It's one reaction that's pointing the way to . . .

Hydrogenation Catalysts of the Future

The above-depicted reaction, turned up by the University of California's (Berkeley) Melvin Calvin in 1938, is still one of the hottest subjects in hydrogenation-catalysis research. That's because it and a handful of similar effects that have since been discovered hold the key to potentially commercial "dream" catalysts that will resist "poisoning," work in a highly selective fashion (no unwanted by-products), and will not require high temperatures and pressures.

Same State: The phenomenon that will accomplish all that: homogeneous catalysis—in which catalyst is in the same phase as reactants. Bulk of the important work in this exciting field is now being done by a handful of experts. But interest is spreading. At the recent International Congress on Catalysis in Philadelphia, for example, homogeneous catalysis held center stage.*

Reason for the interest can be gleaned from an examination of Calvin's original experiment. He found that cuprous acetate dissolved in quinoline (*see illustration, above*) catalyzed the reduction of *p*-benzoquinone at

*Subjects and authors: "A Theorem on the Relation between Rate Constants and Equilibrium Constant" (Japan's Juro Horiuti, Hokkaido University, Sapporo); "Hydrogenation Catalysis by Complex Ions of Cobalt" (Australia's J. Bayston, N. Kelso King and M. E. Winfield); others.

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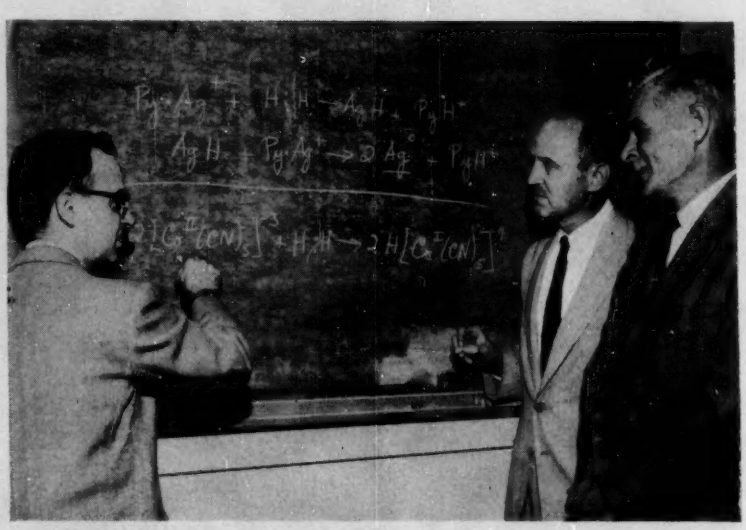

HOUDRY'S WELLER, MILLS, WHEELER: In esoteric findings, new insight.

100 C, that the reducing agent was molecular hydrogen. Normally, molecular hydrogen must be energized by plenty of heat and pressure along with a catalyst like nickel before it will become reactive. These rigorous (and expensive to create) conditions, are obviated—in the laboratory, at least—by Calvin's homogeneous system.

So an increasing amount of hard research is now directed toward turning up new homogeneous systems and probing the mechanisms by which they function. Right now, known homogeneous catalyst systems for hydrogenation include cuprous and silver salts in organic bases; aqueous solutions of cupric and mercuric salts; cobalt carbonyl; base catalysts (e.g., ammonia); platinous ethylene chloride; and a few miscellaneous types such as bacterial activation of hydrogen.*

These known homogeneous systems are valuable primarily for the insight they are providing into the chemistry of catalysis itself. Reason: the new liquid systems allow studies of catalysis at the molecular level. Solid hydrogenation catalysts are relatively hard to study in such depth.

A few commercial processes are thought to involve homogeneous catalysis. The "oxo" reaction—production of aldehydes by addition of hydrogen and carbon monoxide to olefins—utilizes a solid cobalt-thoria catalyst. But it is now believed to proceed because of homogeneous catalysis involving solutions of dicobalt octacarbonyl or cobalt hydrocarbonyl—produced by reaction of cobalt with carbon monoxide.

Strength for the homogeneous-catalysis theory comes from the fact that the cobalt used in the oxo process resists poisoning. Solid (i.e., non-"homogeneous") cobalt is normally quickly "poisoned" by carbon monoxide and sulfur compounds, which are also present. An "homogeneous" catalyst, such as either of the suspected cobalt compounds, however, is insensitive to carbon monoxide or the sulfur-bearing contaminants.

Chemical Construction Corp.'s (New York) process for recovering cobalt and nickel from low-grade ores (*CW, May 17, '52, p. 43*) is also thought to involve homogeneous catalysis. Here, a solution containing cobalt and nickel sulfates is rendered ammoniacal, then hydrogenated under pressure. Nickel and cobalt precipitate. There's evidence, some observers think, that the reduction is aided by homogeneous catalysis with complex metal salts formed *in situ*. Reason: the reduction can be made highly specific so as to percipitate either nickel or cobalt or controlled mixtures of both. And specificity like that is more nor-

*A number of bacteria (e.g., *Escherichia coli*) can activate hydrogen at room temperature via the enzyme *hydrogenase*. Compounds they can hydrogenate include methylene blue; molecular oxygen; sulfate, nitrate and fumarate ions. There's still no agreement on the chemical nature of *hydrogenase*, although some believe it is an iron porphyrin substance. Researchers expect to learn more about the enzyme through studies of cell-free extracts of bacteria.

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mally associated with homogeneous —not heterogeneous catalysis.

Early Stages: But despite such scattered evidence of practical applications of homogeneous catalysis, most of the work is still in an exploratory stage. At Houdry Process Corp., for instance, Chemical Research Director G. Alex Mills and his associates have explored Calvin's reactions and related ones, have elucidated their mechanisms.

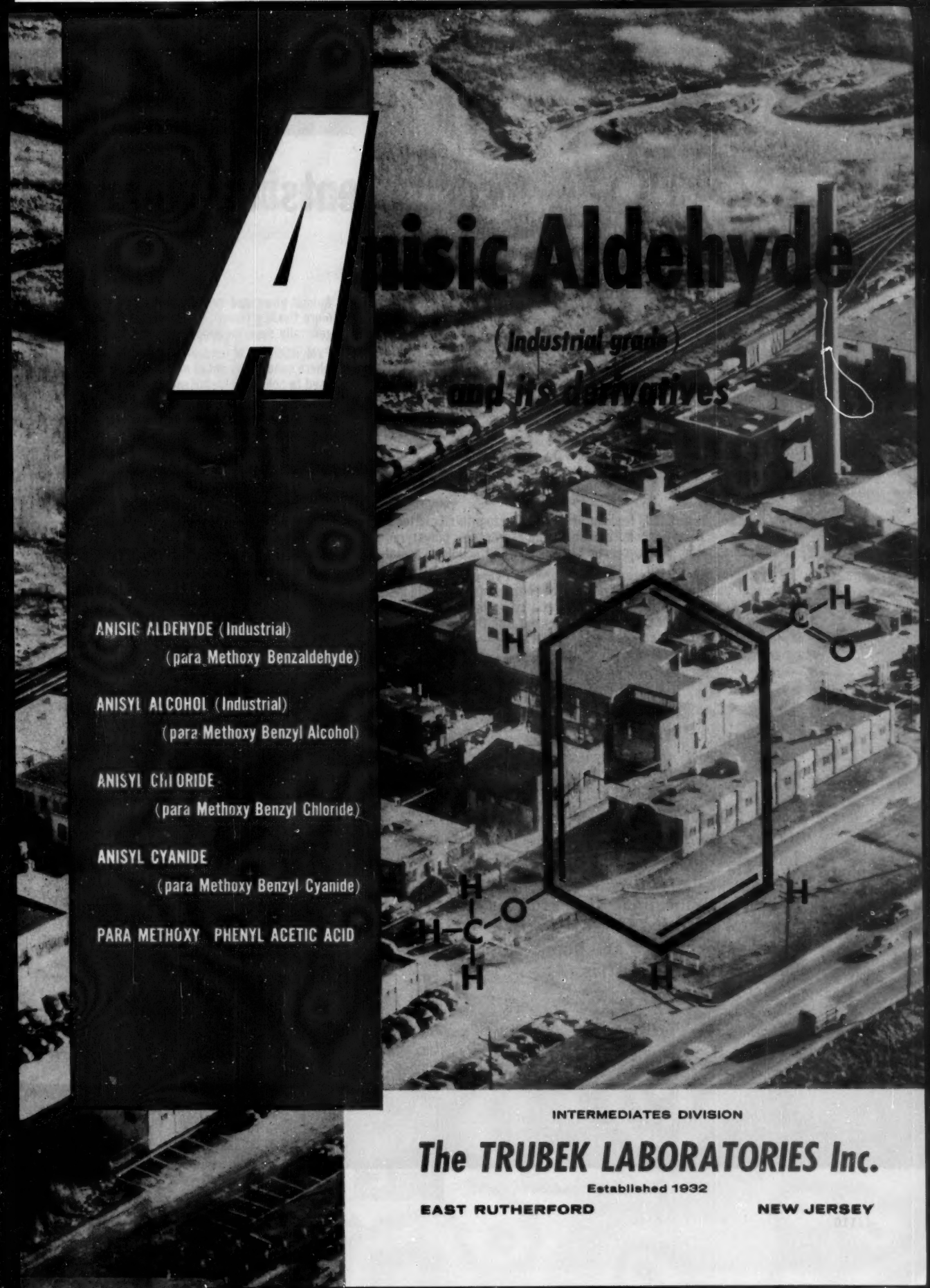
Mills, along with fundamental research section chief, Sol Weller, and senior research chemist, Ahlborn Wheeler, are also giving close scrutiny to other homogeneous catalysis systems—e.g., activation of hydrogen by cuprous and silver acetates in pyridine and dodecylamine.

Recently, Mills and Weller reported on the field of activation of molecular hydrogen by homogeneous catalysts**, observed that "because of the high bond energy of the hydrogen molecule . . . it is generally necessary that the interaction between hydrogen and catalyst system be such that both fragments of the hydrogen molecule be stabilized either by formation of a new bond with a catalyst or solvent molecule (*see illustration, p. 104*) or by solvation in a medium of high dielectric constant."

"It is evident," they say, "that activation of molecular hydrogen does not require the existence of a solid metal having properties associated with a group of metallic atoms. It seems probable that present information on molecularly dispersed catalysts will apply to atoms or ions, present on the surface of metals or metal oxides or sulfides, which singly or in small numbers constitute active sites. Of course the atom on the surface must be affected by the solid bulk . . ."

Mills sees practical aspects to such esoteric findings. He points out that hydrogen, derived from reforming operations, is becoming increasingly abundant (more than 500,000 cu. ft./day is now available). Homogeneous catalysts may prove the best way to turn this hydrogen to economic advantage. And the vista doesn't stop there. Even the direct fixation of nitrogen at normal pressures and temperatures (as accomplished by soil bacteria) doesn't look as remote to him as it once did.

**Advances in Catalysis, Vol. VIII, 1956, p. 163 (Academic Press Inc., New York).


Anisic Aldehyde
(Industrial grade)
and its derivatives
ANISIC ALDEHYDE (Industrial)
(para Methoxy Benzaldehyde)
ANISYL ALCOHOL (Industrial)
(para Methoxy Benzyl Alcohol)
ANISYL CHLORIDE
(para Methoxy Benzyl Chloride)
ANISYL CYANIDE
(para Methoxy Benzyl Cyanide)
PARA METHOXY PHENYL ACETIC ACID
INTERMEDIATES DIVISION
The TRUBEK LABORATORIES Inc.
Established 1932
EAST RUTHERFORD
NEW JERSEY

from gaf 4 effective components for improved a

PVM (Polyvinyl Methyl Ether)

for improved tack, adhesion, flexibility, wet grab.

Polyvinyl acetate plus PVM has improved adhesion to printed matter and adheres more effectively to aluminum, painted steel, polystyrene, polyethylene, wood, paper, cement, cellophane and cellulose acetate.

GR-S, natural rubber and neoprene sensitized by PVM are used for more successful bonding of rubber to rubber, cotton to animal skins and metal to metal. Pressure sensitive formulations based on these rubbers have improved grab and adhesion when compounded with PVM.

Animal glues and dextrins with PVM result in more flexible rewettable coated products with generally superior properties.

PVM itself is a pressure sensitive adhesive where cohesion is not of major importance. It is used to cohere polyethylene to paper wadding.

Polystyrene, coumarone-indene, alkyd and phenolic resins are made more flexible by PVM and have improved adhesion to metal and plastic surfaces.

Wood rosins with PVM produce hot melts and lacquers with improved flexibility and adhesion.

Cellulose nitrate plasticized with PVM has improved adhesion to metal surfaces and chip resistance is increased.

Chlorinated rubber coatings with PVM have increased adhesion to wet cement and blistering is eliminated.

PVM is a resinous polymer normally tacky over very wide temperature and humidity ranges. It is soluble in water but preferentially soluble in organic solvents other than alkyl hydrocarbons.

PVI (Polyvinyl Isobutyl Ether)

has outstanding adhesiveness, tack and plasticity for direct use in many adhesive applications. It is used for pressure sensitive adhesives with long range stability and improved dead load characteristics.

Cellophane tapes made with PVI do not require an anchor coat or subbing base.

Surgical tapes are made by calendering of PVI to cloth.

Fabric cements from PVI have good adhesion for fastening paper, cardboard and cloth to rigid surfaces.

Food packaging pressure sensitive adhesives have been successfully made from PVI.

Specialty adhesives for cork, plywood, linoleum, leather are formulated from PVI.

The PVIs are viscous liquids to rubbery solids. They are soluble in most organic solvents.

adhesives and coatings

PVM/MA

(Methyl Vinyl Ether—Maleic Anhydride Copolymer)

for tack-free films with excellent adhesion and cohesion to varied surfaces and as a superior thickening and suspending agent.

Dextrin with PVM/MA has improved adhesion. Loss of grab in over-wet dextrin is eliminated.

Polyvinyl acetate with PVM/MA shows improved adhesion to metal surfaces and the bond has improved shear strength. With the half amide of PVM/MA the system viscosity is increased.

Sorbitol and PVM/MA gives a pressure sensitive adhesive which can be easily washed off.

PVP with dinonyl phenol and the partial butyl ester of PVM/MA give an adhesive for polyethylene to itself or to paper or aluminum foil. Its use as an ink base for printing on polyethylene is suggested.

Urea or **Polyvinyl alcohol** with PVM/MA gives water soluble adhesives or coatings which can be insolubilized by the application of heat.

Polyvinyl chloride latex viscosity is increased by the addition of PVM/MA Half Amide.

The PVM/MAs are white powders which are widely soluble in polar solvents and capable of undergoing chemical reactions typical of the carboxylic group.

PMAC

(Polymethoxy Acetal)

is a plasticizer, softener and built-in modifier for resins used in adhesives and coatings.

Epoxy resins with PMAC as the reactive diluent result in significant reduction in odor and toxicity problems. The reaction mixtures have lower viscosities so that higher loads are possible. The cured products have higher tensile and shear strengths.

Phenolic resins with PMAC added have improved flexibility without loss of strength in shell molding and resinoid abrasive wheels.

Epoxy modified phenolic coatings with PMAC added show improved adhesion to metal surfaces and better tensile strength.

The PMACs are high boiling liquids with a high degree of compatibility with many organic solvents and resins. They have a strong affinity for inorganic surfaces such as sand, metallic oxides, and metals.

Further details on these products and typical formulations involving their use in adhesives and coatings are given in Bulletin No. P-123.

For technical information, price schedules and samples write to:

GENERAL ANILINE & FILM CORPORATION
COMMERCIAL DEVELOPMENT DEPARTMENT
435 HUDSON STREET, NEW YORK 14, N. Y.

gaf

From Research to Reality

Staley's®

Products from Corn and Soybeans

LECITHIN

Bakers find Staley's Sta-Sol® Lecithin improves dispersion and emulsification of fat, and reduces stickiness of dough. Candy makers use it also to disperse fat and to give better eating and keeping qualities. In chocolate, it reduces viscosity, increases covering power and stabilizes the coating.

Sta-Sol Lecithin works in margarine, lard and shortenings as an emulsifier and antioxidant.

The ability of Sta-Sol Lecithin to emulsify and disperse fats in water along with its wetting and moisture retaining qualities contributes to industries from food processing to the preparation of paints, plastics, adhesives, textiles, printing inks, and petroleum.

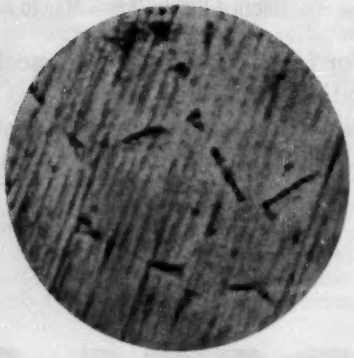
Your Staley representative will be glad to show you how Sta-Sol Lecithin can help you profit. See him now, or write for details.

For information about other Staley Products: Lecithin, Leucine, Phytic Acid, Inositol, Tyrosine, MSG, HVP, Calcium Phytate, Amino Acid Mixtures, Corn Steep Liquor and Fermentation Nutrients, write:

A. E. Staley Mfg. Co.
Decatur, Illinois

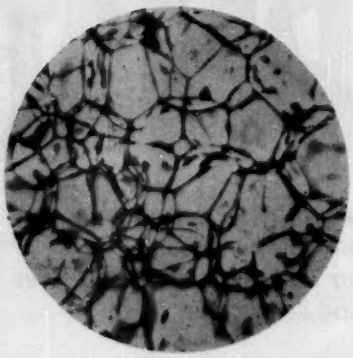
1906 50 1956
ANNIVERSARY

Staley's



Trained on aluminum-tin alloy (lower right), new X-ray microscope (above) reveals grain outline of alloy. Light microscope sees mostly surface scratches (upper right).

X-Ray for New Insight



Visitors to the recent National Metals Exposition in Cleveland got a chance to peer into a new research microscope designed to cut the veil from hidden objects such as contaminants in chemicals, foreign materials in metals, and the internal structure of processed foods. An X-ray microscope, developed by General Electric, it also makes possible examination of specimens in three dimensions.

How It Works: A narrow beam of electrons is focused on a tungsten target (40 millionths of an inch in diameter). This generates X rays, which fan out around the object to be examined, casting a "shadow" magnified by as much as 1,500 diameters. But because the X rays actually pass through the object, the "shadow" is a three-dimensional representation (*see cuts*).

Magnifying power of the newcomer isn't nearly so high as that for electron microscopes. But the newcomer has these advantages over the latter: it reveals structures not otherwise visible, specimens do not require vacuum-mounting or other special preparation.

GE's X-ray microscope was developed—over a four-year span—at GE's engineering laboratory in Schenectady, N.Y., by Sterling Newberry and S. E. Summers. It is produced by the firm's X-ray department in Milwaukee, Wis.

Both of these popular Sharples surface-active agents are winning many new users through their highly desirable properties.

They are powerful detergents and wetting agents as well as effective emulsifiers. Both are highly stable to alkalies and NONIC 300 is also stable in the presence of strong acids and oxidizing agents. Excellent foaming qualities are obtained with both NONIC 218 and NONIC 300. Both are highly soluble in water and compatible with a wide variety of chemical compounds. NONIC 218 has exceptional grease cutting power and is particularly suited to formulation with quaternary ammonium salts.

NONIC 300 is polyethylene glycol alkylphenyl ether and NONIC 218 is polyethylene glycol tert-dodecylthioether. Other NONIC surfactants are available which are similar chemically but modified to obtain special properties.

These versatile NONIC surface active agents are well worth investigating for use in your products. Call or write us for samples and full technical information.

Full Technical Information on Isopropylamine will be sent on request.

Pennsalt Chemicals

'SHARPLES' brand CHEMICALS... products of

INDUSTRIAL DIVISION, PENNSYLVANIA SALT MFG. CO.

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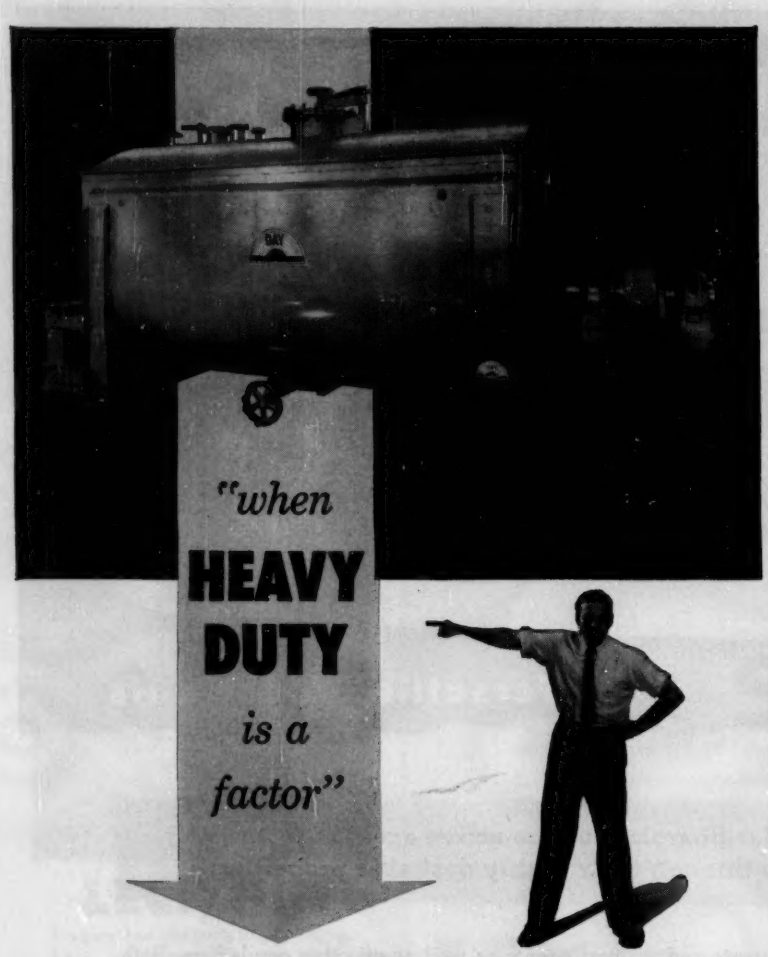
Executive Office: Philadelphia, Pa.
Martin, Heyl & Milne Inc., San Francisco • Los Angeles • Seattle • Portland
Shawinigan Chemicals, Ltd.: Montreal • Toronto
Airco Company International, New York



DAY JUMBO MIXERS... meet every requirement imposed by heavy loads. For instance, the standard-duty DAY Jumbo Mixer is equipped with two roller bearings mounted on heavy fabricated supports. Heavy-duty units have an extra outboard bearing to eliminate cantilever action or drift. Air- and grease-seal stuffing boxes and 3-piece, dust-type covers are standard equipment. Agitators have a laminated outer ribbon, continuous welded, ground smooth, with outer ribbon having a relieved trailing edge to eliminate rubbing action. Tanks can be equipped with heating or cooling jackets for 40, 60 or 80 psi. Available in 600- to 3850-gallon capacities. For complete information write for Bulletin 800.

FOUNDED 1867

in mixing equipment DAY *means longer life span*

THE J. H. DAY COMPANY

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Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products

Eastern Canada: Brantford Oven & Rack Co., Ltd., Brantford, Ontario
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

LITERATURE

• A new 800-reference bibliography, "*Rauwolfia* and Its Alkaloids," is available from S. B. Penick & Co. (New York). Contained: references from several hundred domestic and foreign journals covering the chemistry, pharmacology, pharmacognosy, and therapeutic uses of *Rauwolfia* preparations.

• Just published by Wilkens-Anderson Co. (Chicago) is a new catalog on semimicro laboratory equipment. Special semimicro glassware is described, as well as standard equipment adaptable to micro and semimicro techniques.

• A midget edition of standard infrared spectra in complete sets—printed three to a page on 8½-in. x 11-in. sheets and indexed (by the American Society for Testing Materials) on IBM cards—can now be purchased from Sadtler Research Laboratories (Philadelphia).

• Harshaw Scientific Division (Cleveland) of Harshaw Chemical Co. is out with a new catalog that presents a comprehensive listing of optical equipment and instruments for the metallurgical laboratory.

• A revised, complete bibliography of the literature on G-4 (dichlorophene) has just been published by Sindar Corp. (New York). Technical Bulletin D-2, it contains abstracts of some 109 scientific trade articles as well as abstracts of 12 foreign and domestic patents.

PRODUCTS

Conductive Silicone: Union Carbide's silicones division is out with X-1516 silicone rubber, a new compound that conducts electricity; resists temperatures as high as 400 F, weathering and ozone. One suggested use: for antifogging heater pads on aircraft cameras.

•

Peptide Former: N, N'-dicyclohexylcarbodiimide, a new reagent for the formation of peptide bonds, is now available from Aldrich Chemical Co., Inc. (Milwaukee). Price: $22/100 g.; $170/kg.

•

Hormone Entry: Synovex, a combination of progesterone and estradiol benzoate, is a new hormone for upping beef production. It's a joint develop-

From "Dutch Boy" research... a gel that prevents hard settling in lacquers, plastic finishes

In any paint, pigment particles tend to settle or float, agglomerate or separate.

If they migrate, paint performance goes down. Hues change. Streaking appears. Hiding is lowered. Hard cake forms.

Recent research at National Lead has developed gellants that make paint pigments behave. One of the latest is DUTCH BOY BENTONE® 18-C.

BENTONE 18-C gels high polarity organic solvents, the kind used in making lacquers and vinyl or epoxy resin finishes. In these paints, BENTONE 18-C locks pigments in place.

By its control over pigment suspension, BENTONE 18-C improves color and hiding in lacquers and plastic finishes. In vinyl anti-fouling paints, for example, BENTONE 18-C is unique in preventing hard settling of the heavy cuprous oxide pigment.

It also improves body. Stops sag. Aids spray-ability, hold-out, temperature independence.

Other "Dutch Boy" developments improve other compounds

DUTCH BOY BENTONE 34, for example, improves the characteristics of paints made with lower polarity solvents. Also greases, cosmetics and other compounds. DUTCH BOY BEN-A-GEL® does the same for water-based products . . . water-based paints, liquid polishes, abrasives, and others.

Vinyl compounds, too, are being improved by "Dutch Boy" research. Fourteen stabilizers have been developed. Each is a specific for conditions affecting life and quality in vinyl flooring, insulation, film, sheeting, plastisols and others.

Mail the coupon for detailed information on the "Dutch Boy" chemicals mentioned.

NATIONAL LEAD COMPANY
111 Broadway, New York 6, N. Y.
In Canada: Canadian Titanium Pigments Limited
630 Dorchester Street, West, Montreal

Gentlemen: Please send "Dutch Boy" Brochures checked below:

- ☐ BENTONE 18-C (gels high polarity compounds)
- ☐ BENTONE 34 (gels lower polarity compounds)
- ☐ BEN-A-GEL (gels aqueous compounds)
- ☐ STABILIZERS (F-56-56)

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. . . and get the plus of a name you know . . . for quality

"BUFFALO" CORROSION-RESISTANT AIR HANDLING EQUIPMENT

FUME FANS
- cast iron
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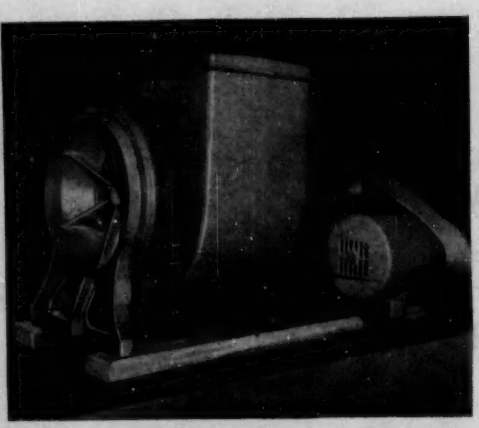
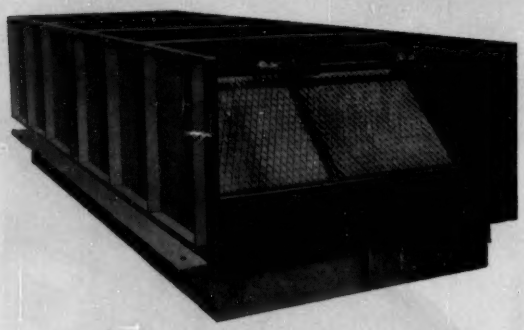
- coated steel
- rubber-lined
- fiberglass





"Buffalo" Cast Iron Fans with highly efficient Monel Wheels used on chemical fume hood exhaust. Available with stainless steel or protective coated steel.

AIR WASHERS
hydraulic scrubbing towers
absorption type washers
rotary gas scrubbers
hydro-volute scrubbers —

(left)
"Buffalo" Absorption Type Air Washer

There is scarcely a chemical air cleaning problem which the broad line of "Buffalo" Equipment cannot solve to your complete satisfaction — and no problem is too severe and specialized for "Buffalo" Air Cleaning Engineering and Development facilities. "Buffalo" Hydraulic Scrubbing Towers are controlling high-temperature, highly corrosive effluents with high collection efficiencies and no clogging problem. "Buffalo" Rotary Gas Scrubbers are handling tough jobs like lamp black, tar vapor and toxic fumes. "Buffalo" Absorption Type Washers are removing acid mists and other "problem" contaminants. All units available with protective coatings, in stainless steel or other corrosive-resistant parts to suit the need. Write us about your problem on your company letterhead, for the most practical solution.

You can select the most durable material and the most efficient design for your exhausting job, when you're looking at the "Buffalo" line . . . everything from our steel plate Industrial Exhausters with protective coating to "Buffalo" Rubber-lined Exhausters to stand up on your most corrosive jobs. Get "Buffalo" recommendations on the exact fans that will leave you with no regrets.

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

RESEARCH

ment of Syntex and E. R. Squibb & Sons, is said to enable steers to gain from 25-33% more weight per day. Squibb is the exclusive distributor in the U.S. for the product, which retails at $2.50/dose (one dose is all a steer requires) with a quantity discount.

•

Sequestrant: Globe Compound Co., Inc., (Waterbury, Conn.), offers a new sequestrant that it identifies chemically as an organic high-molecular-weight polyhydroxy compound. Named Monitor A, it's miscible with water, lower alcohols, polar organic solvents and aqueous solutions of water-miscible solvents; soluble in strong concentrations of acids, alkalis and electrolytes. Price range: 43-60¢/lb.

•

Fine yarn: Caprolan nylon filament yarns in a range of finer deniers are now available from Allied Chemical & Dye's National Aniline Division for evaluation by textile processors. For the past 11 months, the company has been commercially producing heavy Caprolan yarns in the 2,000-50,000-denier range.

•

Bulky Yarn: Eastman Chemical Products (Eastman Kodak subsidiary) reveals development of a new bulky acetate yarn intended for tufted rugs and carpeting, expects production of both white and colored forms to begin in January.

•

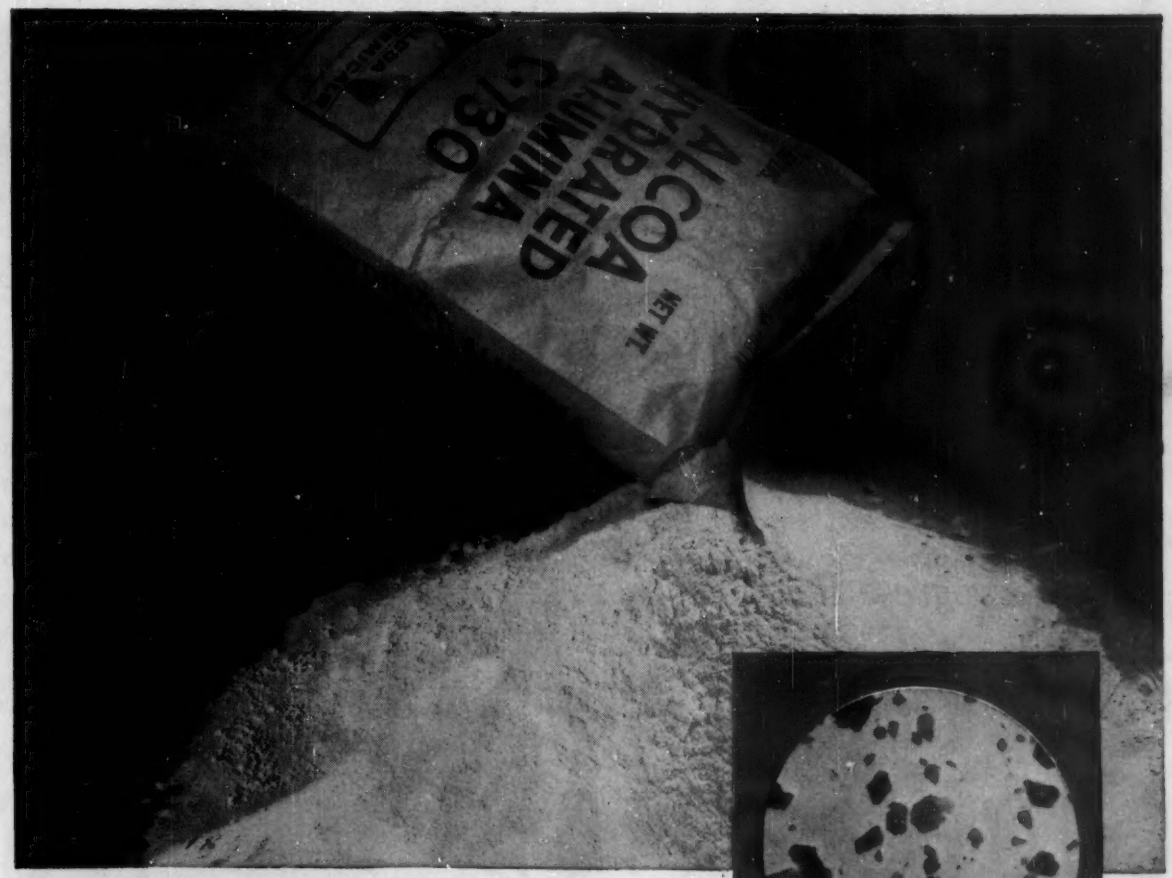
Spectro Pure: Spectrophotometrically pure heptane and hexane for use in research, testing, etc., are now available from Fisher Scientific Co. (Pittsburgh). Each lot is individually tested for purity on an automatic Beckman DK-2 spectrophotometer. Labels bear a facsimile of the absorbtion curve for the particular lot.

•

Odor Free: Koppers Co., (Pittsburgh), offers an improved diethylbenzene called "engraver grade," which it says does not produce objectionable odors when used for etching magnesium with nitric acid in photoengraving.

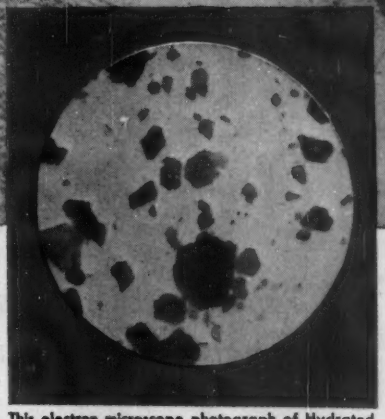
•

Oxide Entries: Columbium and tantalum and their oxides, up to 99.5% pure, are now offered by Kennametal Inc. (Latrobe, Pa.).



Spotlight on a good mixer...

ALCOA HYDRATED ALUMINAS SERIES C-700



This electron microscope photograph of Hydrated Alumina C-730 (magnification 25,000X) shows fineness of particles. Average number diameter is 0.06.

Fine particle size, uniformity, good mixing characteristics and substantial chemical neutrality make ALCOA Hydrated Aluminas Series C-700 outstanding general-purpose pigments. As fillers, coatings, reinforcing pigments and even mild abrasives, they improve the quality of such varied products as natural and synthetic rubbers, plastics, fine coated papers, cosmetics, paints and varnishes, adhesive tapes, cleaners and polishers.

Used as reinforcing pigments in natural and synthetic rubber, Hydrated Aluminas Series C-700 impart high tensile strength, tear resistance and modulus along with good resiliency. They mix easily and rapidly with rubber compounds—with relatively little sticking to the mixing equipment. Their dispersion is excellent.

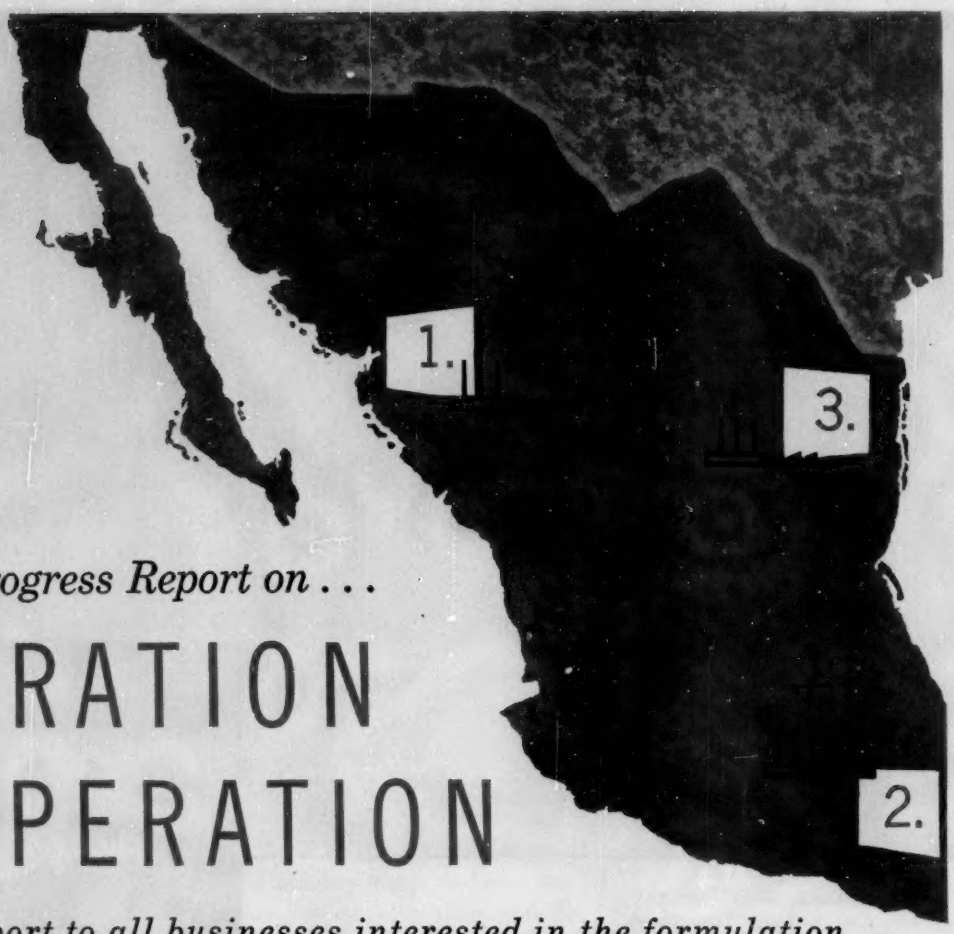
As a paper coating pigment, Hydrated Alumina C-730 gives a coating of great brightness, opacity and gloss with a high degree of whiteness. Ink receptivity is high for the degree of gloss obtainable.

Equally desirable physical characteristics are obtained when Hydrated Aluminas Series C-700 are used as a filler in plastics, particularly vinyls . . . as pigments in casein paints . . . as a relatively soft, extremely fine abrasive in special polishing applications . . . or as a very fine, soft filler or base for cosmetic powders.

If *you* have need of an outstanding general-purpose pigment for *your* products, it will pay you to investigate ALCOA Hydrated Aluminas Series C-700. You'll find their contributions to better products often cost less than pigments you now use. Get complete information by writing ALUMINUM COMPANY OF AMERICA, 707-L Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA CHEMICALS
ALUMINUM COMPANY OF AMERICA

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS



A Progress Report on . . .

OPERATION COOPERATION

A report to all businesses interested in the formulation and marketing of agricultural chemicals anywhere in the world

In Mexico, "Operation Cooperation" has set a pattern for a venture in Pan Americanism that is now being duplicated in several other countries in Central and South America.

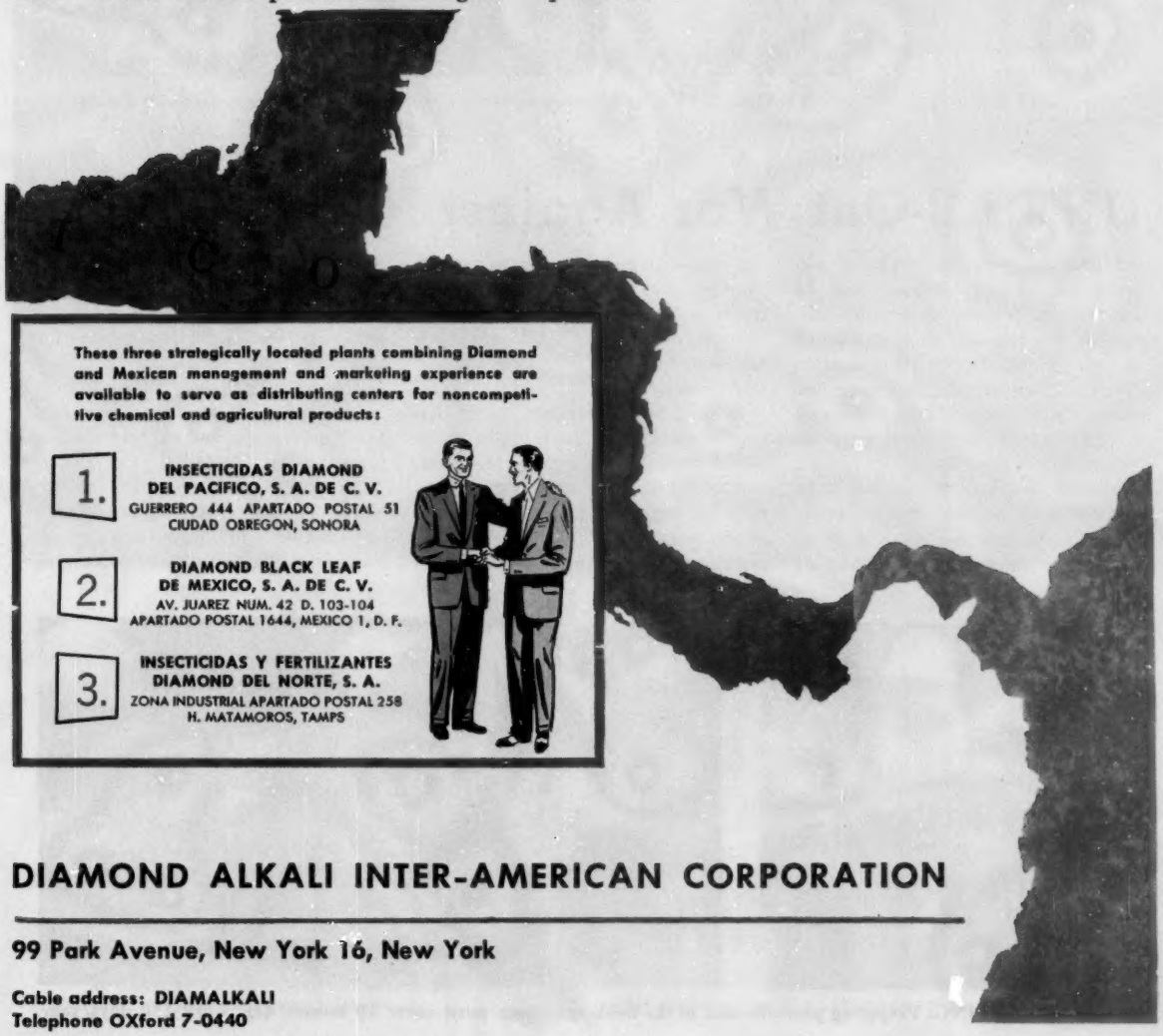
Here Mexican initiative, enterprise and capital have joined forces with DIAMOND ALKALI and DIAMOND'S specialized technical knowledge. From these trailblazing efforts in international cooperation have come many benefits: economic opportunity and security for *more* workers, greater stability for their communities, better products at lower cost for local agriculture and a powerful stimulus for further industrialization and development of the areas.

As a result of this forward looking part-

DIAMOND ALKALI CHEMICALS ®

nership plan, Mexico now has three major, strategically located plants producing formulated insecticides and other agricultural chemicals, managed and operated by Mexican personnel with DIAMOND technical cooperation.

In addition to providing facilities and skills for the volume production of agricultural chemicals, these plants are also ideally suited to serve as distributing points for related and noncompetitive products. If you are looking for established distribution facilities with experienced personnel, it will pay you to consult DIAMOND ALKALI Inter-American Corporation.



These three strategically located plants combining Diamond and Mexican management and marketing experience are available to serve as distributing centers for noncompetitive chemical and agricultural products:

1. **INSECTICIDAS DIAMOND DEL PACIFICO, S. A. DE C. V.**
GUERRERO 444 APARTADO POSTAL 51
CIUDAD OBREGON, SONORA

2. **DIAMOND BLACK LEAF DE MEXICO, S. A. DE C. V.**
AV. JUAREZ NUM. 42 D. 103-104
APARTADO POSTAL 1644, MEXICO 1, D. F.

3. **INSECTICIDAS Y FERTILIZANTES DIAMOND DEL NORTE, S. A.**
ZONA INDUSTRIAL APARTADO POSTAL 258
H. MATAMOROS, TAMPS

DIAMOND ALKALI INTER-AMERICAN CORPORATION

99 Park Avenue, New York 16, New York

Cable address: DIAMALKALI
Telephone OXford 7-0440

UNTRAINED TEAM: Mexican crews are being taught best spray methods for the . . .

UN's All-Out War Against Malaria

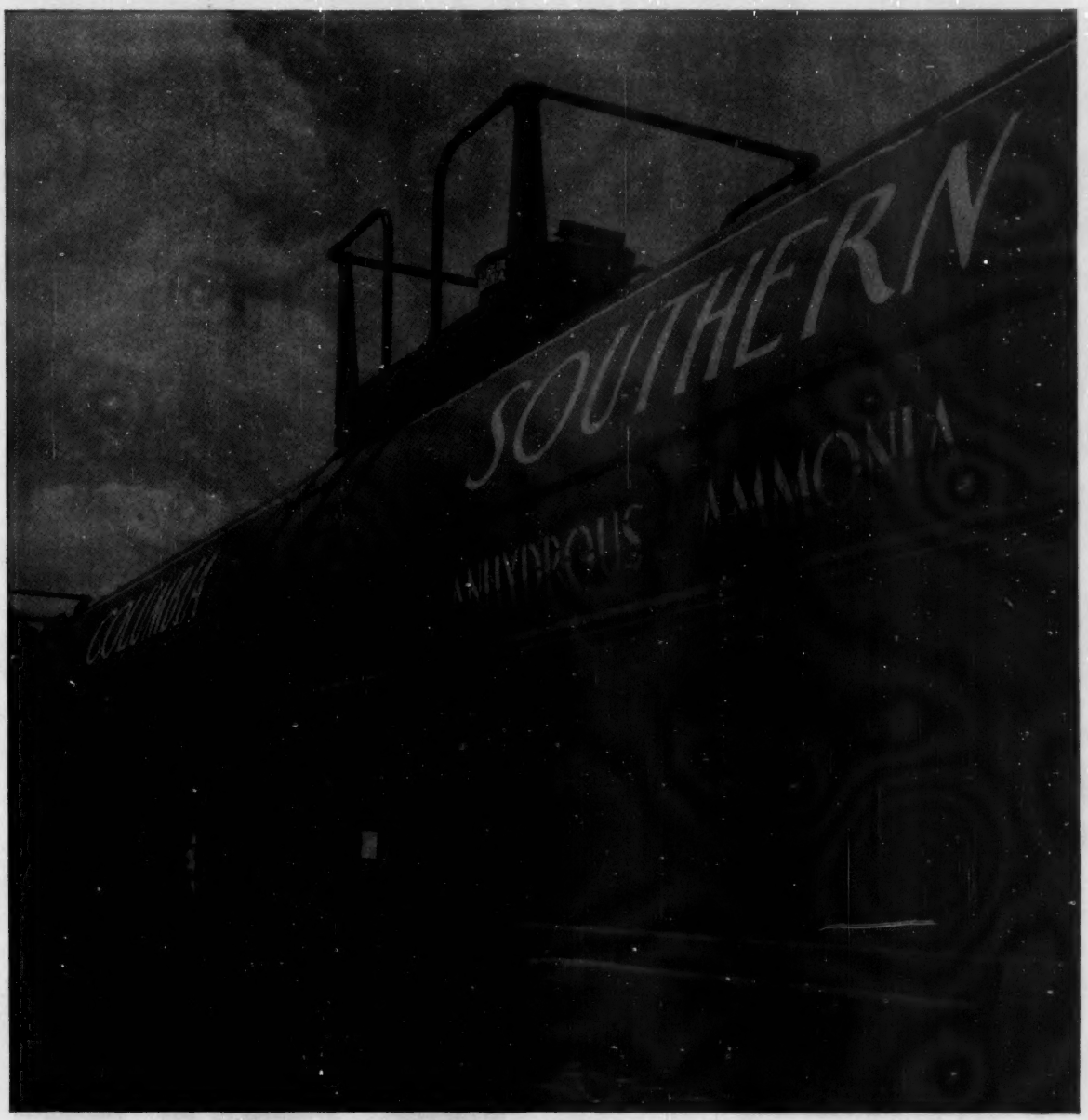
Within the next six weeks, a juggeraut attack on malaria will be launched in Mexico, under the auspices of the UN and its special agency, the World Health Organization (WHO). The program, to cost an estimated $24 million and take four years to complete, is intended to deal the disease a knockout blow.

Malaria eradication on this scale has been made possible by effective residual insecticides. Besides a boon of inestimable value to 250 million of the world populace (Mexico is only the beginning), the UN program will mean a substantial long-term market for a variety of specialty formulations and equipment. Millions of pounds of insecticides will be required.

Biggest Stake: Mexico, which has been surveying and planning its eradication attempt all during this year, is the Western Hemisphere country with the biggest stake in the success of the program: 52% of the malaria mortality in the Americas occurs in Mexico (nearly 25,000 die yearly), which contains about 45% of the hemisphere's malaria zones. Some 64% of the nation's populace is unprotected from the disease; 2 million are infected each year. Surveys indicate that economic losses of more than $160 million yearly can be traced to malaria.

As part of its campaign, Mexico will spray some 3 million dwellings—from mansions to hovels—at least once a year until 1960. Easily accessible

FIELD MIXING: Preparing pesticide mix in the field, spraymen must cover 10 houses/day, work 250 days/year.



Columbia-Southern ammonia is a required basic chemical in the production of explosives, plastics, synthetic fibers, paper, refrigeration, water treatment, metallurgy, and many other chemicals.

NEED AMMONIA?

Columbia-Southern customers are accustomed to fast, efficient, courteous service

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago
Cleveland • Boston • New York • St. Louis
Minneapolis • New Orleans • Dallas • Houston
Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

If you have chemical processes involving high vacuum evaporation, distillation, or vacuum cooling of corrosive materials, it will pay you to consider Croll-Reynolds corrosion resistant EVACTOR Units and condensing equipment.

C-R Steam-Jet EVACTOR Units can maintain absolute pressures down to 50 microns Hg. abs., depending upon your process requirements. Our engineers have made thorough studies of all of the latest corrosion-resistant materials, and can incorporate them into your installation as needed to guarantee long, dependable trouble-free service.

In order to assure you of maximum efficiency in your installation, we prefer to design the equipment to match exactly the vacuum, cooling or evaporating load conditions of your process. If you will furnish us with details, we will be glad to submit specifications and suggestions. Write, wire or phone . . .

CROLL C R REYNOLDS

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Main Office: Westfield, New Jersey
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CHILL-VACTORS • STEAM-JET EVACTORS • AQUA-VACTORS
FUME SCRUBBERS • SPECIAL JET APPARATUS

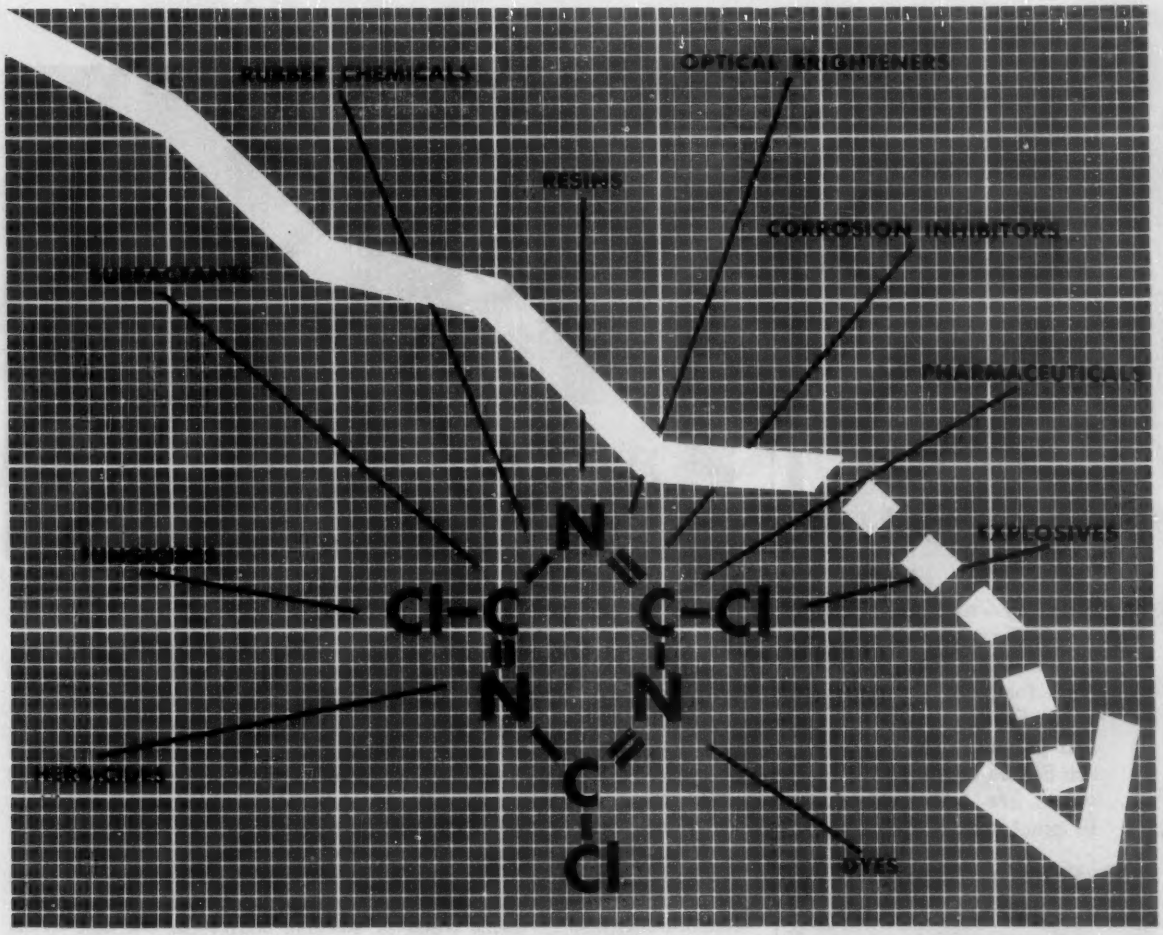
STUCK: Jeeps, horses, truck will be used on rugged back roads.

NOTHING OVERLOOKED: Mud huts and mansions will be sprayed.

MARKET TALK: Word of mouth, leaflets in dialect tell of program.

structures will received a DDT spray twice a year; the more isolated ones, a single spraying each year. That means an average of seven sprayings for every dwelling. And they are to be thorough sprayings—walls will be covered to a height of more than 3.5 yards, and furniture doused top and bottom with chlorinated insecticides.

As the program is outlined, Mexico will need 11,331,614 lbs. of 75%-DDT and 483,399 lbs. of 100%-DDT (for twice-a-year sprayings); and 3,048,627 lbs. of 50%-dieldrin (for the once-a-year sprayings and for the final spray on all houses). Each square me-



New Price Reduction for

AERO* cyanuric chloride

broadens potential applications!

It will pay to take a new look at the wide fields that now open for potential applications of AERO Cyanuric Chloride. Cost considerations, which have been a barrier in many fields in the past, no longer prevent you from enjoying the benefits of this remarkable intermediate. Now down to one third of its initial commercial price of six years ago, AERO Cyanuric Chloride is showing increasing promise in the production of agricultural insecticides, specialty resins, surfactants and rubber chemicals. Large current volume usage in the manufacture of optical brighteners continues to expand.

The number of possible derivatives based on the remarkably stable triazine ring of Cyanuric Chloride are virtually unlimited. For details on the chemistry of this product, request a copy of the Cyanamid booklet, "AERO Cyanuric Chloride." It also contains extensive information on applications, well indexed as to source material.

*Trademark

CYANAMID

AMERICAN CYANAMID COMPANY
MANUFACTURERS CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

If a better solvent would improve your product...use one!

don't ride a dead horse

Quality—and sales—can suffer with standard solvents that aren't *just right* for your product. If this is your case, what can you do? Try Eastern States where *all* solvents are tailor-made to exact specifications!

Prompt Delivery

Yes, Eastern States Chemical not only gives you fast delivery—but also assures you highest quality, purity and absolute uniformity. Don't *YOU* "ride a dead horse." Find out how Espesol solvents can help your product. Mail coupon today!

ESPECO EASTERN STATES Chemical Corporation

ESPESOL

Eastern States Chemical Corp.
Dept. C-11176, P.O. Box 5008
Houston 12, Texas
Phone: Walnut 3-1651

Gentlemen: I would like to know more about solvents produced by Eastern States.

Name_____
Firm Name_____
Address_____
City_____ Zone____ State____

WISHING WELL: Mexico's hope is that 1960 will mean the end of malaria.

ter of wall surface will receive 2 grams of DDT, or 0.60 grams of Dieldrin.

Of the $24 million earmarked for the program, $8 million will be supplied by the United Nations International Children's Emergency Fund (UNICEF), for insecticides, supplies, spraying equipment, jeeps, etc. Mexico's Ministry of Health will provide the other $16 million for warehousing, administrative and personnel costs.

U.S. Supplies: UNICEF is buying supplies through its New York office. DDT, to be delivered to six Mexican ports, is being bought chiefly from U.S. firms. In addition, dieldrin has been purchased from Shell Chemical Co. Generally, these will be mixed as wettable powders in suspension, but, in cases where water will not cling to wall surfaces or would leave a stain, the insecticides are mixed with Rohm & Haas' Triton combined with xylene.

Sprayers were ordered from the Hastings, Minn., plant of the Hudson Manufacturing Co. (Chicago), and special nozzles from Spraying Systems, Inc. (Chicago). All purchasing was done through sealed bids.

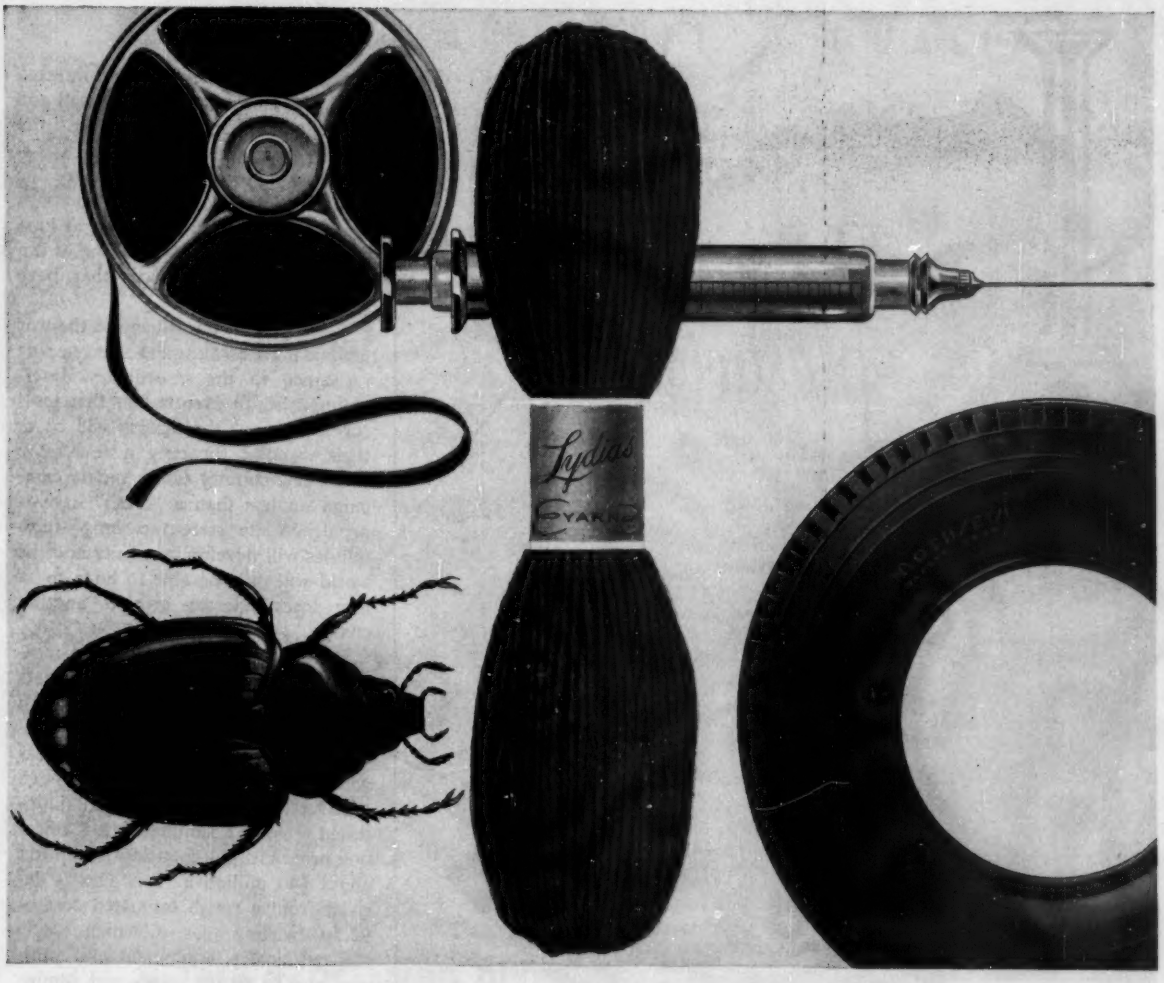
Problem in Logistics: Insecticides and equipment will be carried to the areas of use by some 200 jeeps, 500 horses and a wide assortment of trucks and boats. Much of the territory to be covered is virtually inaccessible, and some of it is quite dangerous. In the State of Chiapas, near the Guatamalan border, there is a "lost" tribe of Indians—the Lacandons—to be handled. They are hostile, and so primitive that they still hunt with bow and arrow.

Dodging Machetes: Although a leaflet, explaining the campaign, has been printed in 12 Indian dialects, as well as Spanish, the job of informing the population is far from complete. Twenty-five dialects are spoken in the country. Workers have reported being kept out of dwellings by misunderstanding natives—in one case by an old woman wielding a machete.

"But absolutely every dwelling place in malarious areas will be sprayed, including those of the Lacandons," vows Dr. Donald J. Pietsch, World Health Organization entomologist who is technical advisor to the project. Any loopholes in coverage could prove fatal to the whole program. From even a single remaining haven, the disease could re-attack the whole country.

Long-Lasting Dream: The eradication of malaria, as planned by WHO, does not mean that mosquitoes as a whole will be eliminated. The plan depends upon the fact that malaria is a parasite that infects man and certain mosquitoes. Man can transmit the parasite to the mosquito, and vice versa.

The eradication program aims at breaking this transmission chain by spraying the dwelling places of man in malarial areas. Two facts make this an effective road to elimination of the disease: man is only bitten by the mosquito while at home at night, and the comparatively recent residual insecticides remain active on the walls for



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Rohm & Haas methylamines are ideal low-cost sources of basic organic nitrogen. They can be used as intermediates for many products, including rubber-vulcanization accelerators, pesticides, quaternary disinfectants, pharmaceuticals, photographic developers, dyestuffs, and wetting agents.

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Write to Department SP for authoritative information to assist you in research, process development, and plant design.

Chemicals for Industry

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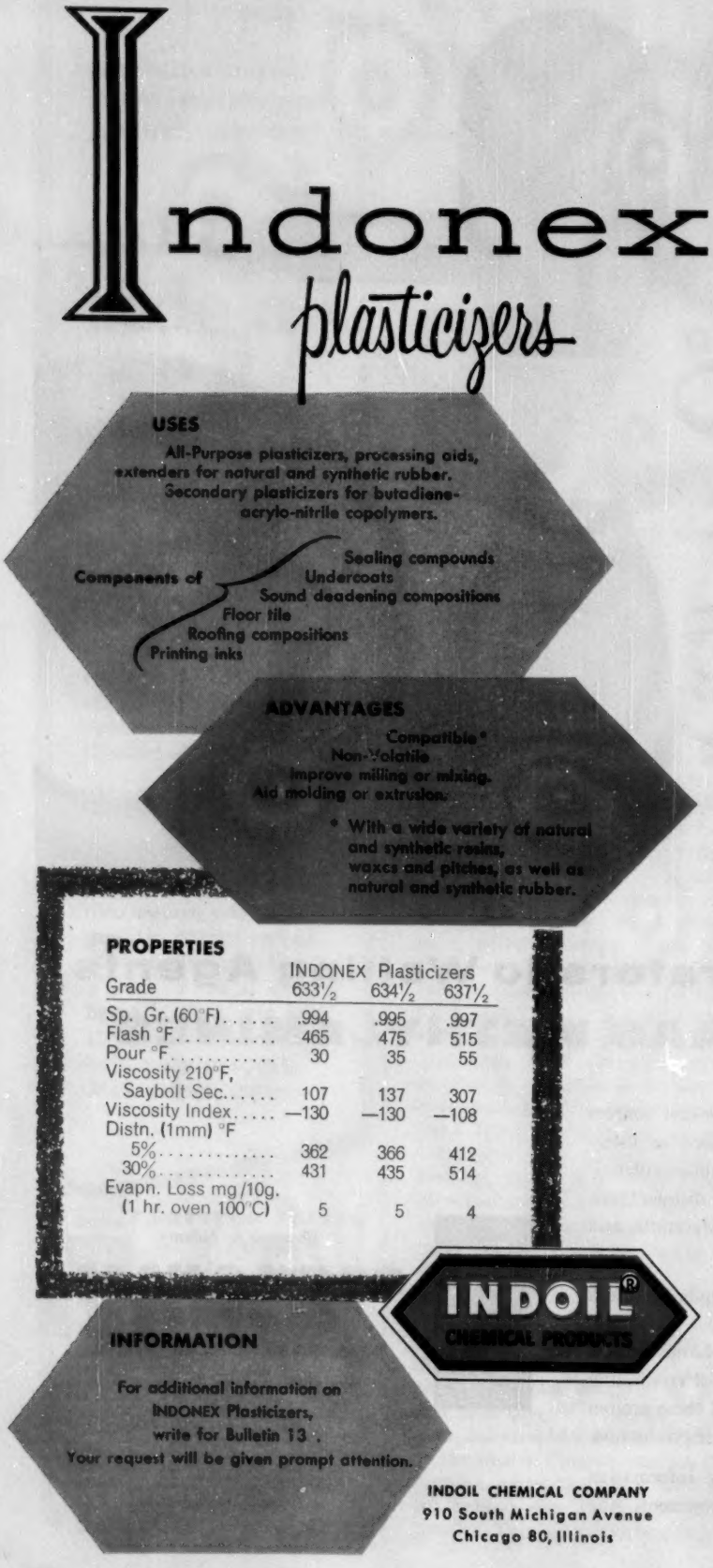

6-12 months. After biting an infected man, the mosquitoes fly to a wall and are killed. The man will shake off the disease in a matter of months.

Now or Never: This is one of the reasons that malaria eradication is a worldwide program now. For, as long as the disease remains anywhere, it is a potential threat to places that have once wiped it out.

Adding more immediacy to the war is the danger of mosquitoes developing resistance to the insecticides. International health experts fear that tools for wiping out the disease will be at their disposal for only a few more years. If a country essays such a campaign on less than a "crash" basis—or delays its start too long—mosquitoes will develop immunity and the world will only be able to hope for a new insecticide to give it another chance.

It is believed that it takes the mosquitoes of any area seven or eight years to develop a resistant breed—which doesn't allow too much time to countries planning programs. Most areas will be starting up this year or next. WHO estimates that if all malaria-infested areas had simultaneous eradication programs, the total cost would run about $40 million a year. This is derived from a rough estimated cost of $2.50/dwelling/year, of which 70¢ is for insecticides, equipment and vehicles, and $1.80 for wages and administration.

WHO is optimistic. It believes that with programs already completed, plus those now in force, and a few others yet to be begun, malaria should be eliminated from the world within 7 or 8 years. The situation as of now:

• Malaria has been eliminated in the United States, Chile, Crete, Italy, southern India, French Guiana, and part of Venezuela.

Eradication programs are under way in Argentina, the Dominican Republic, Ecuador, El Salvador, Granada, Guatemala, British Guiana, Haiti, Honduras, Mexico, St. Lucia and Venezuela, plus parts of the Near East and Southeast Asia.

• Expected to begin eradication programs in the next year or so are Bolivia, Colombia, Costa Rica, British Honduras, Jamaica, Nicaragua, Panama, Peru, Surinam, Trinidad and Tobago in the Americas; Israel and West Pakistan in the Eastern Mediterranean; Afghanistan, Burma, India, and Indonesia in South-East Asia.

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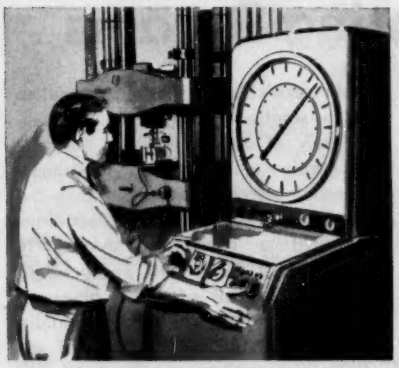

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Crew readies spray planes for "raid" on . . .

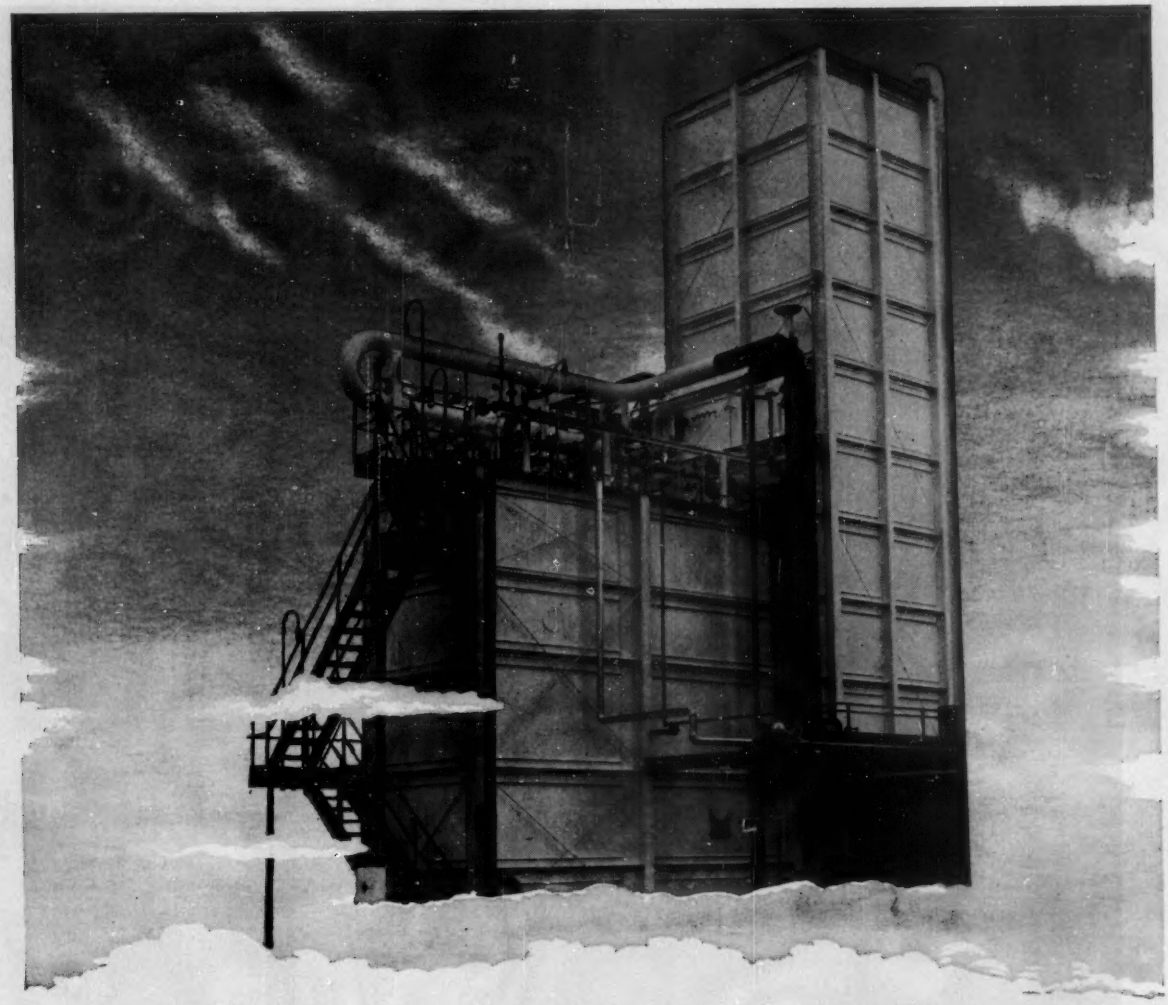
Rampaging California forest fire.

Now: Firefighting Borates

Autumn's flaming foliage has taken on a somber aspect for California. A rash of forest fires in the San Bernardino mountains has swept away acres of priceless timber, endangered hundreds of lives. The conflagrations provided a grim and desperately realistic test for a new approach to chemical control of forest blazes.

The "new" chemical is essentially a crushed and screened form of sodium-calcium borate. Four to six pounds of the material, tradenamed Firebrake by its developer, U.S. Borax and Chemical Corp., are mixed in each gallon of water; this stable suspension is dumped on fires at 800-8,000/gal. rates.

It serves both to help kill fires, and



This plant's stockpile is worth millions--

yet it doesn't cost a cent!

The "wild blue yonder"—the free and limitless atmosphere — is the stockpile for Air Products Oxygen (and/or Nitrogen) Generators. There are no delivery problems for this inexhaustible raw material. There are no price fluctuations and no shortages to trouble the owners of these plants.

The method is basic. The production of oxygen and nitrogen from air is accomplished by "Low-Temperature Processing". The air is liquefied by refrigeration and the nitrogen is drawn off at its boiling point (fractional distillation) leaving the pure oxygen product.
Your own "On-Location" Generator can provide you with a continuous supply of oxygen regardless of your requirements —including moderate to large tonnage users. We will furnish and install a complete facility at no capital investment on your part—on a lease basis including a purchase option. If you prefer, we will operate and maintain the facility and guarantee your oxygen savings.

Send us details regarding your requirements and expected future needs. We will then give you a realistic estimate of the savings you can expect with an Air Products Generator installed in your plant.

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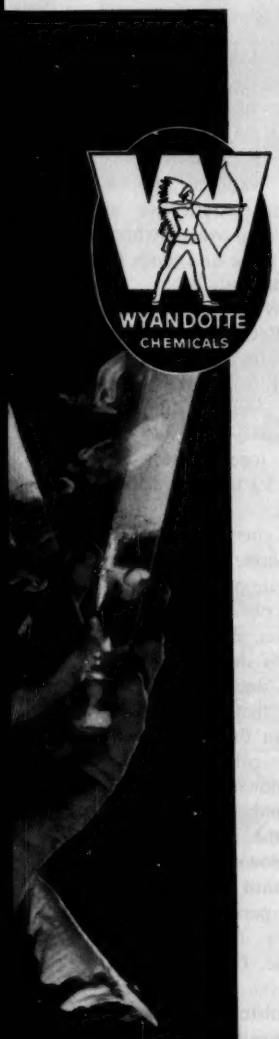

Chemical Distributor . . .

Order Taker?

Chemical Expert? *Magician?*

Counselor? Warehouser?

The chemical distributor may not be a magician, but he wears many hats . . . and he wears them well.

He has to—in the vital part he plays in the rapidly expanding, complex chemical industry.

With all these duties, he needs all the help he can get from a manufacturer.

Wyandotte realizes this. We do more than just furnish our distributors with quality products. We also help our distributors to sell them. Some examples:

Wyandotte backs up its products with the strongest national, trade, and technical advertising in its field.

Wyandotte distributors are constantly posted on new product developments, new product uses. They are furnished with all the latest specifications, technical and application data, and everything else they need to help them sell Wyandotte products.

Wyandotte's technical service is always available to meet the needs of our distributors' customers.

Every Wyandotte distributor knows this. How?

The Wyandotte distributor policy is clear-cut, and written down. This works to his advantage as well as to ours, and encourages him to give his customers the kind of service on Wyandotte products that they have a right to expect.

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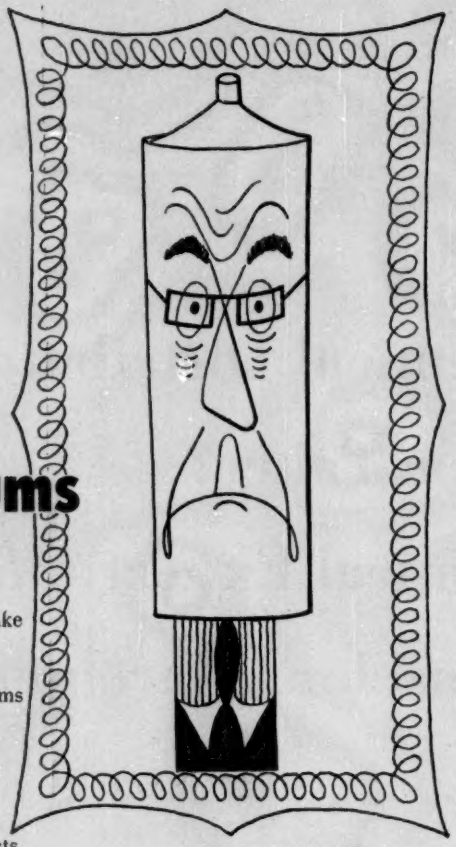
Antique Ideas

about

petrolatums



Progressive formulators of a wide variety of products find in Penn-Drake Petrolatums many useful characteristics. There was a time when petrolatums were considered suitable materials *only* for drug and cosmetic products. But now they are advantageously used in hundreds of diverse products. Some are listed below:

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provide these desirable properties:

- **UNCTUOUS**
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- Detackifiers
- Water repellents
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SPECIALTIES

protect much of the nearby vegetation that might otherwise ignite.

The material was used to a small extent on four of California's recent fires. Jay Peterson, fire control officer of Angeles National Forest says: "It is particularly effective in finger areas and slop-overs—where fire has crept up a ridge and tends to jump down the other side."

Mix and Serve: Working out application and most effective use of the borate has required almost three years. About 90 tons of Firebrake were used this year; U.S. Borax, still testing it, donated about half; the rest was purchased by the forestry services. Price now is $101.50/ton in carload lots of 100-lb. bags.

For field use, the chemical is mixed with water in concrete mixers, and 120-gal. loads are pumped into modified Stearman spray planes. The Stearmans are flown over the fire areas, and the Firebrake is dumped (rather than sprayed) in one batch. The tests have shown that planes that can carry more than the little Stearmans would be particularly valuable.

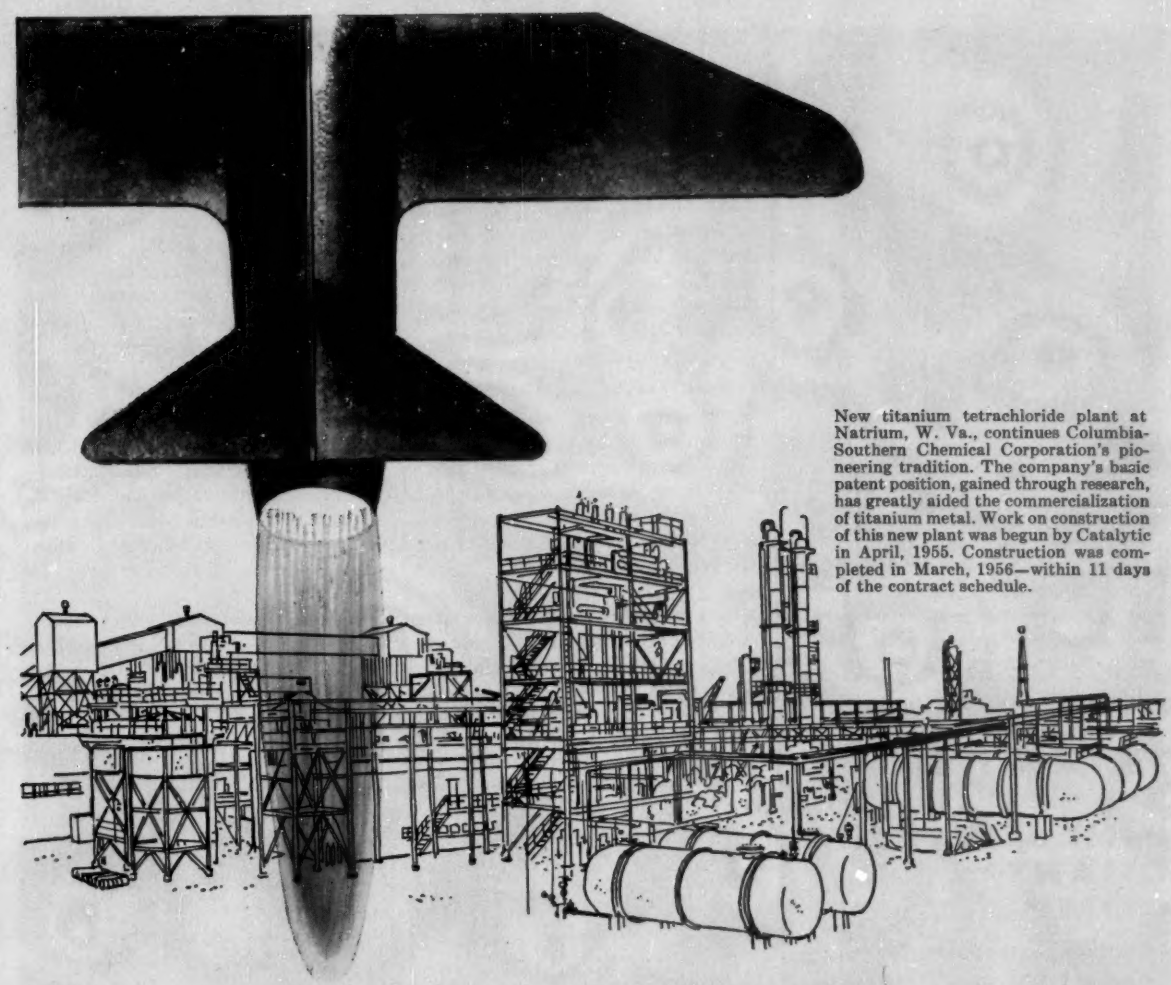
Firebrake has shown up well as a retardant and holding agent until crews can get to the spot. Officials hope it will slow down and contain lightning-set fires until they can be reached by ground personnel.

It isn't necessary to apply the chemical by airplane. Ground equipment is valuable, too, and it looms as particularly promising for protecting roadside vegetation from the carelessly tossed cigarettes that have started a sizable portion of forest fires. How long a period of protection is offered by the advance spraying of Firebrake isn't known yet.

In its Firebrake, U.S. Borax has a product that seems to have an assured future. Forestry agencies provide both a large and an enthusiastic market. As Peterson remarks of Firebrake, "It may very well herald the day when we can have absolute control of forest fires before they wreak their usual damage."

•

Twins Again: Recalling the spectacular success of its "Which Twin Has the Toni?" campaign in 1947, the Toni Co. (Chicago) is bringing the slogan back for another try. The new twins will be featured in Toni's "humidity test" commercials, designed to show a longer-lasting quality in the home permanent.



New titanium tetrachloride plant at Natrium, W. Va., continues Columbia-Southern Chemical Corporation's pioneering tradition. The company's basic patent position, gained through research, has greatly aided the commercialization of titanium metal. Work on construction of this new plant was begun by Catalytic in April, 1955. Construction was completed in March, 1956—within 11 days of the contract schedule.

$TiCl_4$
(Titanium tetrachloride)

A new multi-million dollar plant at Natrium, W. Va., is the answer of *Columbia-Southern Chemical Corporation* to the task of producing $TiCl_4$—titanium tetrachloride—which in turn is used in production of titanium.

Titanium is metallurgy's answer to the need for metal resistant to high temperatures—as in supersonic aircraft.

Titanium tetrachloride—the product of this new plant engineered and constructed by Catalytic—has opened up important markets in diversified other fields as well as in production of titanium sponge. Its many uses include the manufacture of catalysts for plastics, the making of titanium esters, and service as a reducing agent for dyes.

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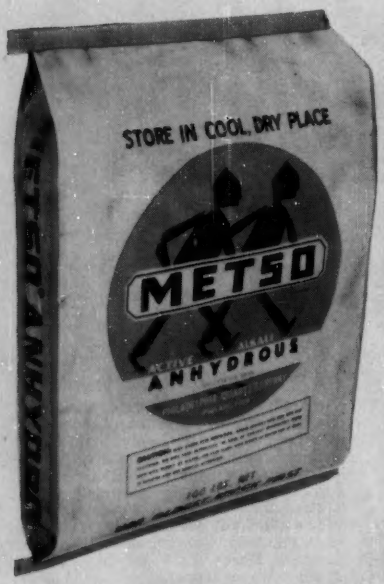

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SPECIALTIES

PRODUCTS

Vitalized Hair: Making its debut in Canada now is a vitamin-fortified hair tonic, called Pantene. J. H. Andrews Ltd. (Montreal) is selling the product, which is already available in Europe. Pantene, in formulations for dry and oily hair (and a special blue type for gray hair), is said to contain a vitamin of the B-complex group.

•

Foot Fog: Aerosol-packaged for convenience, a new foot balm is now being marketed by Tru-Pine Co. (Chicago). Sprayway foot spray is said to offer both germicidal and fungicidal components that help eliminate athlete's foot and also make the feet more comfortable.

•

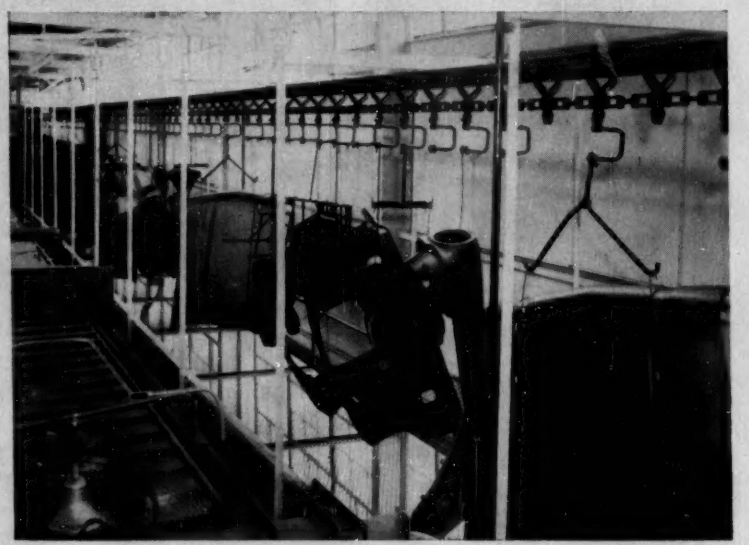
Safe Step Up: Lightweight, nonconductive, corrosion-resistant, polyester-and-glass-fiber ladders are being introduced by Putnam Rolling Ladder Co. (New York). The ladders, made of polyester supplied by American Cyanamid, have magnesium rungs, weigh about 2 lbs./ft., and are available in lengths up to 20 ft.

•

Road to Durability: Union Carbide and Carbon Corp. is selling a new form of nonwater-soluble silicone as an antispalling agent for use on concrete. Applied to new concrete (about 7 days old), the silicone improves water repellency, helps make the concrete resistant to calcium salts that can cause degradation of the concrete. Spalling has proved to be a particular problem—on bridges, near highway curves and at intersections—where auto acceleration and deceleration seems to hasten wear of concrete surface weakened by the freezing-thawing action of absorbed moisture.

•

Gilding Simplified: Gold surfacing—on metals such as stainless steel, as well as on glass and porcelain—is said to be easier and cheaper by a new process of Hanovia Chemical & Mfg. Co. (East Newark, N.J.). For about



Automaker Tries Flow Coating

GONE from the two primer lines at Pontiac Motors are the hooded spraymen and deep vats for dipping. Pontiac has switched to "flow" coating many parts with primer. How it works: painting area has 80 nozzles (which pour paint onto the sheet metal parts), a special drip-catching area, followed by baking ovens. As photo shows, manpower requirements are reduced to practically zero and—because high-capacity dip tanks are eliminated—paint stocks can be kept low. Pontiac and Chevrolet, so far, are the only General Motors plants to use flow coating on a production basis. They use it only for primer now.

Natural gas—400 million cubic feet a day—pours into the Petro Extraction Plant from the Panhandle Eastern Tuscola compressor station. After removal of hydrocarbons, the gas is returned to Panhandle Eastern lines for transmission as fuel gas.

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36% Zinc as metallic. For agriculture and industry.

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Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

Samples, specifications and detailed information upon request.

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

SPECIALTIES

$17, up to 60 sq. ft. of surface reportedly can be coated with 22-carat gold. Possible uses: on store fronts, lettering on porcelain, and architectural finishes. Hanovia doesn't go into detail about the new process.

•

Concentrated Cleaner: Liqui-Det is a new liquid synthetic detergent introduced by Oakite Products, Inc. (New York). A concentrate, it's designed for all types of industrial cleaning (everything from brewery floors to diesel engine cab interiors).

•

Hot Bounce: New silicone rubber for use in hot applications—oven doors, engine gasketing—is available from General Electric. SE-751, as the new material is called, is a low-compression-set rubber that withstands 600 F temperatures, is easily tinted and calendered.

•

Dark Pair: Two new colloidal dispersions of carbon black have been marketed by Columbian Carbon Co. These are suggested for use with lacquers (CO-Acrylateblak NC-1401 with acrylics, Coblac 405 with nitrocellulose) to produce high-gloss finishes.

EXPANSION

Painted Desert: A $300,000 Arizona paint expansion program has been started by Mathews Paint Co. in Phoenix, is expected to take three years. To be built are a 20,000-sq.-ft. plant in Phoenix, and five new stores in other Arizona cities. A Phoenix retail outlet has been opened already.

•

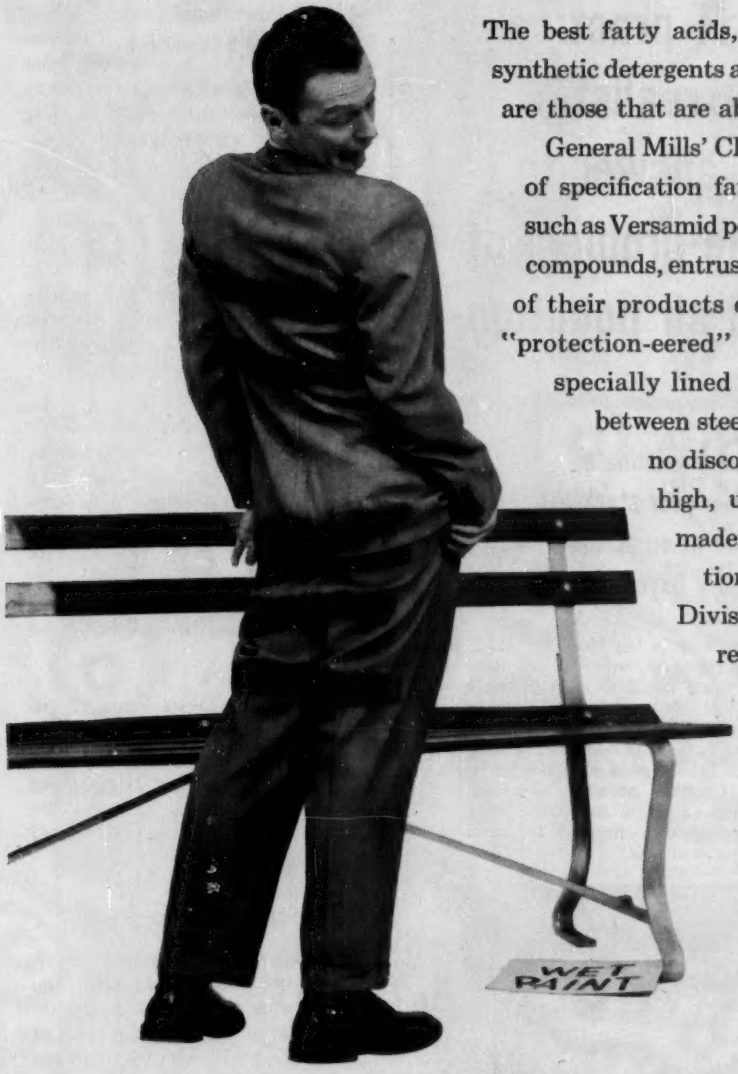
Ink Increase: Furthering California Ink Co.'s expansion program (in past years, the company has completed a $250,000 plant in Portland, Ore., opened a new branch in Sacramento, Calif., doubled in size its branches in Honolulu and Phoenix), the company has just purchased Columbia Printing Ink and Roller Co., Ltd. (Vancouver, B.C.). The 52-year-old concern, operated as a partnership by H. C. Winn and F. W. Duggan, will continue to operate under its present name as a subsidiary of California Ink. The plant will be modernized and expanded.

•

California Glow: Lawter Chemical Co. (Chicago) will build a $100,000 plant to make fluorescent paint and

"Another product safely shipped in Inland 'protection-eered" Containers"*

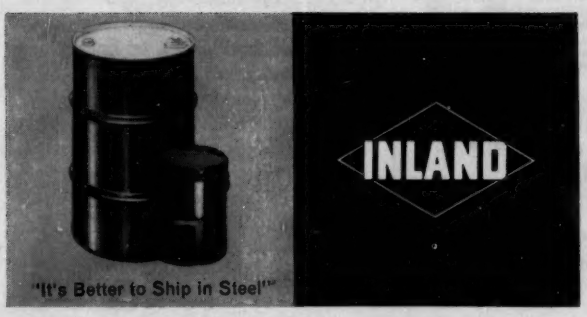
is discoloration your problem?



The best fatty acids, ingredients for soaps, cosmetics, synthetic detergents and a variety of other end products, are those that are absolutely color-free.

General Mills' Chemical Division, a major producer of specification fatty acids and specialty chemicals such as Versamid polyamide resins and Fatty Nitrogen compounds, entrusts the job of maintaining the purity of their products during shipment to Inland Steel "protection-eered" containers. These containers are specially lined to permanently prevent contact between steel and product; no iron pick-up . . . no discoloration . . . no contamination. The high, uniform quality of these products made to strict color stability specifications by the General Mills' Chemical Division, is maintained from shipping to receiving docks.

If quality control during shipment or storage is a problem with your product, why not talk over your problem with Inland's packaging specialists. Write Bob Boecher, Dept. 316A



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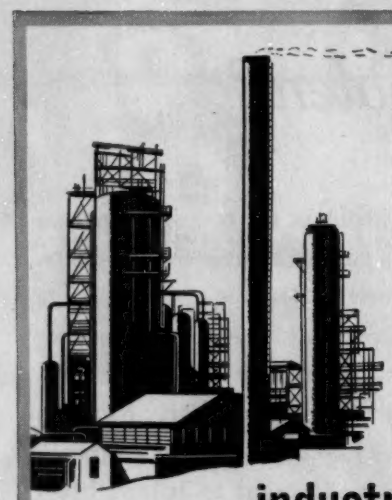

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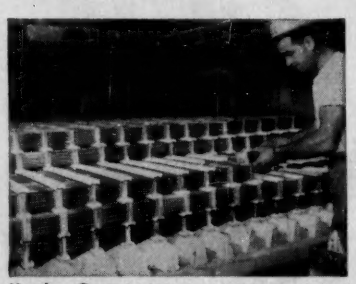
Catalytic oxidation can now eliminate objectionable fumes and odors from your stack exhausts effectively, efficiently — and often at an actual saving — with the use of Houdry Oxycats®

Properly engineered to your individual requirements, Houdry catalytic installations can eliminate, or reduce below objectionable levels, harmful and irritating fumes and odors in an exhaust stream.

These Oxycat installations are working effectively for a wide range of industries where combustible and organic pollutants are present, including solvents, phenols, formaldehyde, phthalic anhydride, polyethylene and carbon monoxide. Oxycats can also be used to oxidize H_2S and organic sulfides and to reduce oxides of nitrogen. And in many cases the heat released by the oxidation process will result in important fuel savings.

The key to any successful catalytic installation, of course, is the catalyst itself. Oxycats have an outstanding advantage in their exceptionally long life at high efficiency. There's no problem of frequent cleaning or reprocessing because of the Oxycat's remarkable ability to withstand contaminating agents and clogging.

It's best to design Houdry Oxidation Catalyst installations into your plant when it is in the blueprint stage. But your engineers, working with ours, can effectively install Oxycats in any existing plant. If air pollution is a problem in your operation—if foul-smelling, irritating fumes and odors are costing you neighborhood good will—Houdry Oxidation Catalysts present a solution you cannot afford to overlook. Write on your business letterhead for complete information now.



Houdry Oxycats being installed in a waste heat boiler at a Sun Oil Co. catalytic cracking unit at Marcus Hook, Pa. This Oxycat installation and a similar one at Toledo save Sun Oil $400,000 a year by oxidizing waste gases to generate 100,000 lb. of process steam an hour.

OXYCAT

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OXY-CATALYST, INC.

INDUSTRIAL DIVISION

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Fume Elimination Processes and Equipment

Industrial • Automotive • Consumer Products

Representatives in major industrial areas

varnishes on a newly purchased one-acre site at San Leandro, Calif. Construction of the 10,000-sq.-ft. structure is expected to start immediately.

•

Ex-Urbanite: Administrative offices and the research laboratory of Permatex Co., Inc., have been moved from Brooklyn to Huntington Station, Long Island. The new 10,200-sq.-ft. building is completely air conditioned.

•

Arizona Agriculture: To serve the rapidly developing farm areas in Arizona, Stauffer Chemical Co. has built a new agricultural chemical plant in Phoenix. Like other units of Stauffer's 17-plant ag-chem network, the new plant will operate as a relatively autonomous regional enterprise.

•

More Wax: Wax users can look for more montan waxes. Farbwerke Hoechts AG. (Frankfurt, Germany) has added a new plant to process crude, brown-coal-derived products. They will be sold in the U.S. by Wax & Rosin Products (New York). Recently tradenamed I. G. Waxes or Gersthofen waxes, they will be tagged Hoechst waxes.

•

New in Glue: Adhesives Mfg. Industries, Inc., has just begun operations in St. Louis. The new firm, with a 14,000-sq.-ft. plant employing about 10 persons, produces adhesives for such uses as labeling bottles, gluing fiber containers.

Place for Pressure

Propellent storage capacity at G. Barr & Co.'s Chicago aerosol filling plant has been increased to nearly 900,000 lbs. by the recent addition of five storage tanks with a combined capacity of 380,000 lbs. The installation is believed by the company to be the largest in the aerosol industry for stocking propellents.

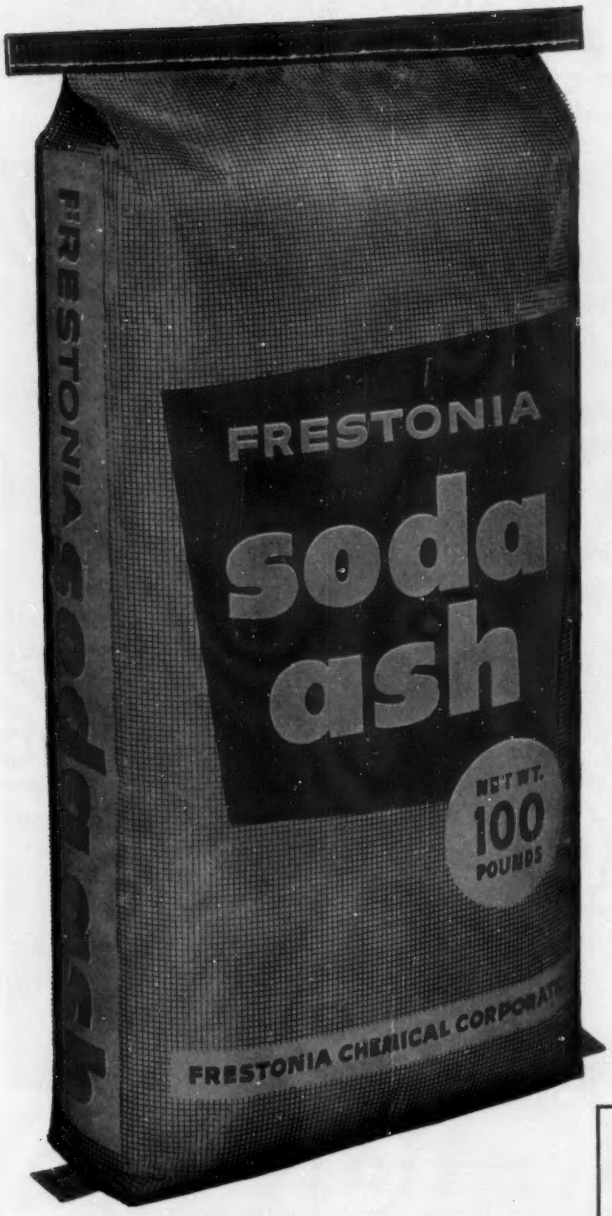
The new tanks are expected to;

- Speed handling of tank cars on the plant's railroad siding.
- Allow stocking of a variety of mixtures of propellents.

The propellent will be piped directly into the plant's refrigeration system; from there, it will be run cold into the aerosol filling lines.

Barr reports that permanent supply tanks are also in operation at the New York and Los Angeles plants.

FOR YOUR **MULTIWALL** SHIPPING SACKS



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New Union Uni-color printing saves up to $6 per M

You get the effect of a colored outer sheet. Actually, the stock is natural color, printed with Union's new Uni-color process. You save the cost of a colored outer ply, or all-over printing. You also achieve the appearance of a two-color design, using only one color.

Send for samples. Better still, ask to see how this economical and effective design treatment can be used on your multiwalls.

UNION'S 5-POINT MULTIWALL EFFICIENCY PLAN saves you money, helps you get better packaging performance. Includes analysis of design, equipment, construction; specification control; plant survey. Ask for details.

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Q. *Could engineering in plastics molding make a significant contribution to the furniture field?*

A. **DRAWERS THAT COMBINE THE ADVANTAGES OF PLASTICS WITH THE WARMTH OF WOOD**

Another example of

CHEMICAL PROGRESS

You've often dreamed of a drawer like this! A drawer that won't warp or stick . . . that's free from dust-collecting joints . . . that's light yet sturdy. Now it's a reality—with *molded plastics* drawers—developed, engineered and molded by General Electric's Plastics Department.

Molded plastics drawers are moisture-proof, non-warping. Their seamless, jointless, round-cornered construction makes them far easier to clean. Molded in a variety of sizes and colors, they are produced as complete units, ready for the addition of facings to match wood grains or plain finishes, traditional or modern styles of furniture.

These drawers are opening up new markets for plastics—in the furniture field . . . the home construction field . . . cabinet making . . . and the do-it-yourself fan who finds them ideal for creating arrangements of his own design.

* * *

For more information on plastics drawers by General Electric, write to *Dept. PL, CHEMICAL AND METALLURGICAL DIVISION, General Electric Company, Decatur, Ill.*

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GENERAL ELECTRIC

Technology
Newsletter

CHEMICAL WEEK
November 17, 1956

More details on Vulcamicina, the antibiotic discovered at Lepetit Laboratories in Italy (*CW Technology Newsletter, July 28*) were revealed at the recent National Congress of Medicine and Surgery at Milan. Here's what was reported:

In experiments to date, the material has given exceptional results in treating septicemia, endocarditis, osteomyelitis and pulmonary infections. It seemed to be generally effective, in fact, against all infections produced by the *staphylococcus aureus* and *proteus vulgaris*. And they are normally hard to knock out.

It is still early for definitive statements; but, on the basis of tests made, the Italian discoverers think they may have come up with the most potent antibiotic of all.

•

You can expect industry to take a more commanding role in nuclear irradiation testing.

AEC has made it clear that it wants industry to take on the bigger share of this task. It has asked industry to build test-reactor facilities, is offering financial help. At the same time, however, it wants to reserve space in such reactors for its own use.

To persuade industry to step in AEC says that henceforth it will permit outside use of AEC test-reactor facilities only when private facilities are not available. Moreover, it hopes soon to invite industry proposals to supply the irradiation services it needs. No timetable has been set for this, however.

In the meantime, AEC is developing the specific criteria that will be needed for such services as testing reactor materials and components that will be subjected to intensive radiation and corrosive influences, and testing of electronic and other components of military vehicles or weapons systems.

•

Two new chemical developments in the field of medicine that are whipping up a lot of interest:

• A vaccine effective against some viruses that cause upper respiratory tract infection is moving closer to commercial reality. National Institutes of Health's Division of Biological Standards (the agency that licenses the Salk vaccine and other biologics for sale) is now working up manufacturing specifications for the material—essentially a cold vaccine. NIH says it will take months for the specs to be completed, won't say whether or not it has any applications from pharmaceutical firms to sell such a product (although a Midwest pharmaceutical maker reportedly has applied).

• A physician at Philadelphia's Hahnemann Hospital has found a chemical that promises to shorten immobility in some fracture cases from six months to three days: Michael Mandarino, an assistant in the orthopedics department emphasizes that the work is still in an early stage but shows great promise.

This is the idea: The broken bone is cleaned and partly filled out with stainless steel wires (to provide reinforcement). The chemical is poured in, hardens in about a half hour. The surgeon then removes the excess, much as a bricklayer trowels off cement.

Mandarino says he worked on the technique for a year before he dared try it on humans. He then used it successfully on two men. Because the technique still requires a great deal of study, he will not say what the chemical is, except that it's quick-hardening.

•

A new theory of nuclear fission is also sparking interest—and some controversy. Robert Carroll, a Navy scientist has proposed a new way of obtaining energy. His theory has met with a considerable amount of skepticism. But the Air Force has decided to set up a $100,000 project to explore it.

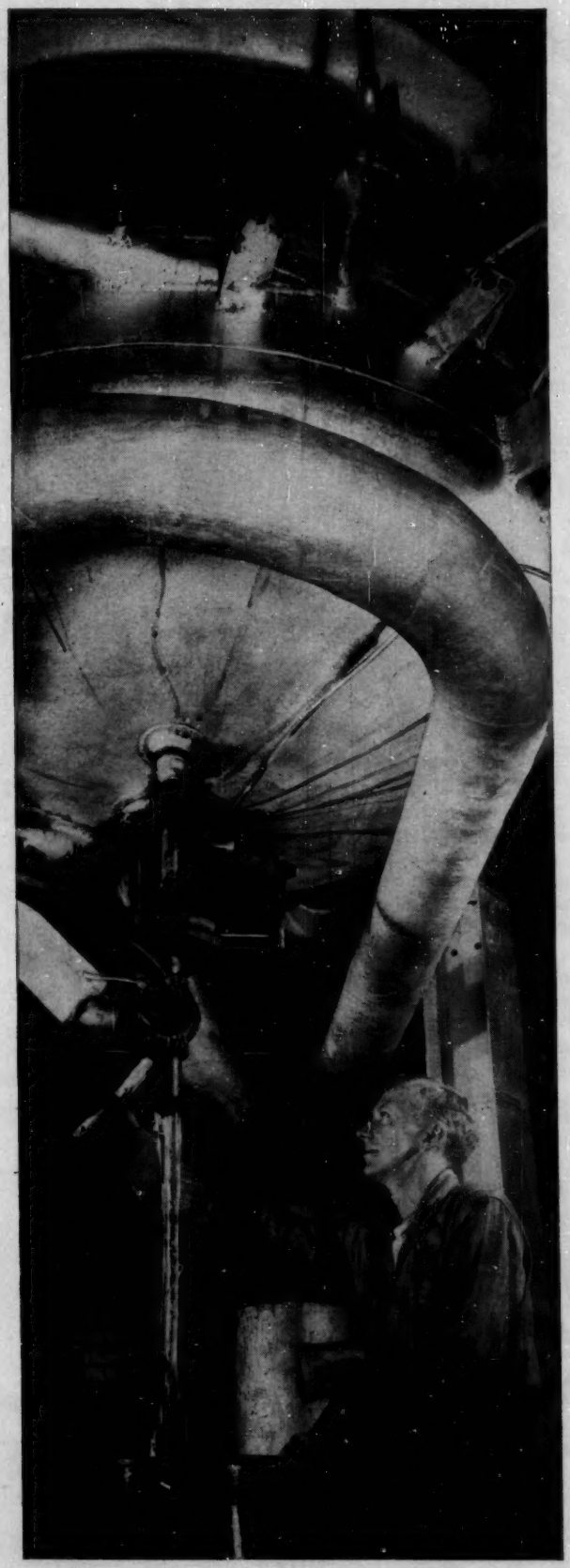
In essence, Carroll maintains that lowering the temperature of any material causes the electron shells to shrink, move closer to the nucleus. If you carry this far enough, the negative electrons will closely approach the positive particles of the nucleus, cause it to split wide open. Moreover, he says, this can be the basis for a self-sustaining chain reaction.

To accept this theory, you have to revise your ideas about absolute zero—the temperature that must be approximated for the reaction to take place. Carroll feels that absolute zero, as known now, may not be true absolute zero. Reason: absolute zero as we know it is derived from the perfect gas law, that "the thermodynamic temperature scale does not define the absolute zero as such a point in temperature."

He makes no claims about having found methods to exploit his theory. His main goal now is to indicate that the proposed nuclear reaction exists in the generation of cosmic radiation in space, and that it is not physically impossible for science to attain and control such a reaction.

•

Standard Oil of Ohio has embarked on a 5-year program to investigate the feasibility of recovering billions of barrels of petroleum from Asphalt Ridge (Uintah County, Utah) tar sands. If tests disclose an economic process, Sohio will build an extraction and "vis-breaking" plant at Vernal, Utah.



DOW

busy BISPHENOL A top resin intermediate

Versatile Dow product widens markets for paint formulators

Fast-moving epoxy resins have sky-rocketed in production since World War II, and Bisphenol A is a basic building block in their manufacture. The future looks even brighter with coatings based on these resins moving into many untapped fields.

Dow pioneered the development of substituted phenols and is the major supplier and best source of high-quality Bisphenol A. The company also supplies two other important resin intermediates—*p-tert*-Butylphenol and *p*-Phenylphenol.

Dow production of Bisphenol A has been increased tremendously. Your opportunities for its use in epoxy resins are now greater than ever. Dow welcomes the opportunity to assist you on your particular application. And one other factor—Bisphenol A is now shipped in 50-lb. multiwall bags for easier, faster handling in your plant. Other Dow chemicals used in resin manufacture by industry include diethylenetriamine, epichlorohydrin, Dowanol® products and polypropylene glycols. For specifications and delivery information call your nearest Dow sales office, or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 843B-1.

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Asia Tops Sources of U.S. Tin Imports

	Metal	Concentrates*
	(long tons in 1955)	
Malaya	**47,126**	
Indonesia		**6,969**
Thailand		**2,208**
Bolivia		9,765
Belgium-Luxemburg	7,064	
Netherlands	5,869	
United Kingdom	4,071	
Belgian Congo	320	713
Mexico		254
Canada		168
All Others	268	35
Total	**64,718**	**20,112**

* In terms of tin metal content.

Suez: Tocsin for Tin?

The crisis in the Suez area has sent a nervous ripple through notoriously sensitive world tin markets, starting prices spiraling upward, sparking fears of further tightening of supplies. The reason: two-thirds of all U.S. tin imports come from the Far East, and about 75% of this is normally shipped through the Suez Canal.*

Whether or not U.S. consumers are likely to feel a (tin) supply pinch is moot—no one seems to have a ready answer. Contract buyers are well stocked for the remainder of '56, and perhaps through Feb. '57. On the other hand, buyers of spot tin—and this includes some who also buy large contract quantities—will be the first to feel a tightness if it develops.

One indication that spot buyers aren't hard pressed at the moment is manifest in what happened to tin prices immediately following the closing of the Suez Canal: spot quotations leaped to a high of $1.14/lb., but soon dropped to $1.10. (This compares with 94-96¢/lb. in June, $1.07 in mid-September, $1.03 in early October.)

One likely reason why tin buyers couldn't be stampeded into paying such inflated prices is that closing of the Suez didn't mean that supplies would be cut off for long. There would be delays, of course, because of disrupted shipping schedules, but only until shipments could be rerouted via Cape of Good Hope and Panama Canal routes.†

Nonetheless, U.S. tin consumers will follow Middle East developments closely because how high tin prices will eventually climb depends largely on how long the Suez remains closed and how well the emergency shipping schedules can handle the required imports from the Far East.

In 1955, more than 70% of all U.S. imports of tin metal came from Malaya (*see table*), almost 35% of all imports of tin concentrates came from Indonesia, while 10% came from Thailand. (Virtually no tin is mined in the U.S.)

Who Will Worry? In 1955, some

*Importers of Straits tin (Malayan tin) estimate that 90% of their shipments pass through the Suez.

†The 15% freight increases that went into effect last week on shipments through Panama or around South Africa apply only to Far East materials destined for European markets (it's some 4,000 miles further to England by way of South Africa than through the Suez). However, shipments to the U.S.—via the Panama Canal—take no longer than through the Suez; in fact, a small part of Far East tin is regularly brought to this country by way of Panama.

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As a major producer of caustic and many other basic chemicals, Pennsalt *must* know and does know the day-to-day developments in technology and markets affecting the caustic picture. ALL USERS OF CAUSTIC SODA, large and small, can learn a lot, *be saved a lot*, for their tomorrows through Pennsalt's new free counseling service. Pennsalt has answers to questions you may not even think of asking. How does this service, given today, keep you ahead of the game tomorrow? . . .

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You may be able to cut caustic costs considerably by changing grade, container, volume, purchasing schedule, or storage facilities. Pennsalt will help you decide what's best for you.

. . . through advice in handling and traffic
What's the safest, most economical method *for you* to handle caustic and other heavy chemicals? How to unload, dilute, store, pump, etc.? Materials for tanks, pipes? Pennsalt has the answers for you—free.

TRY US TODAY! Ward off, with Pennsalt's help, the unseen difficulties even the wisest caustic user encounters—let Pennsalt help you keep on top of your technical and purchasing problems before tomorrow comes! There's no obligation to you in calling the nearest Pennsalt office, or sending the coupon below.

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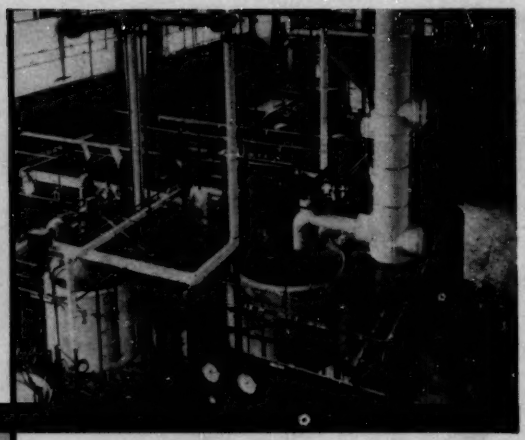

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Through newly expanded facilities, (above) Metal Hydrides Incorporated can apply the profitable advantages of hydride reductions or condensations to your process. By sending us your material and having us carry out the hydride step, you gain the benefit of unmatched hydride application and production experience, perfected process-control techniques and the economy of an established plant operation. Your inquiry will bring full information!

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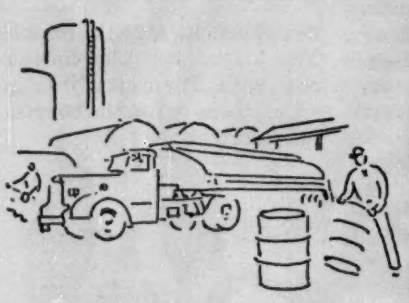

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MARKETS

91,000 long tons of tin were consumed in the U.S. This total demand —60,000 long tons of primary, 31,000 tons of secondary tin—was 9.7% higher than in '54; by comparison, total use in '54—54,000 tons of primary, 29,000 of secondary—was 8.4% greater than in 1953. (The quantities of secondary tin included 2,800 tons in '55 and 3,300 tons in '54 contained in imported tin-base alloys.)

Nonchemical uses absorbed the major portion. More than one-third of the total—or 33,546 long tons—were made into tin plate. The two next largest outlets were solder, and bronze and brass, which required 22,055 and 20,350 long tons, respectively.

Tin consumption for other nonchemical purposes in '55 were (long tons): Babbitt metal, 4,460 long tons; tinning, 2,530; bar tin, 1,540; type metal, 1,500; white metal, 1,120; collapsible tubes and foil, 920; miscellaneous alloys, 540; terne plate, 310; piping and tubing, 160 long tons.

Tin Chemicals Grow: Use of tin in the manufacture of tin chemicals has been expanding rapidly; demand in '55 was 1,969 long tons—19% more than in '54, compared with a much smaller, albeit still healthy, 10% increase in '54.

This growth has been due partly to the development of many new organotin compounds which are going into rubber paints as stabilizers, textile treatment, wool preservation, manufacture of fungicides and insecticides, curing of silicones, slime control in paper mills, and the stabilization of polyvinyl chloride plastics—an increasingly important use.

Applications of inorganic tin compounds are better known. These include uses as opacifiers and color stabilizers in ceramics and glazes, ingredients in dentifrices (stannous fluoride). Other uses, though less noticeable, are nonetheless sizable. For example, the plating of automotive pistons to prevent scuffing during breaking-in periods requires an average of 0.045 lbs. of soduim stannate per car, adds up to some 360,000 lbs./year (assuming an annual production of 8 million cars).

Consensus is that the market for tin chemicals will continue to climb at a healthy pace, provided, of course, that the search for substitute materials is not accelerated by serious shortages of tin, which has happened before and could well happen again.

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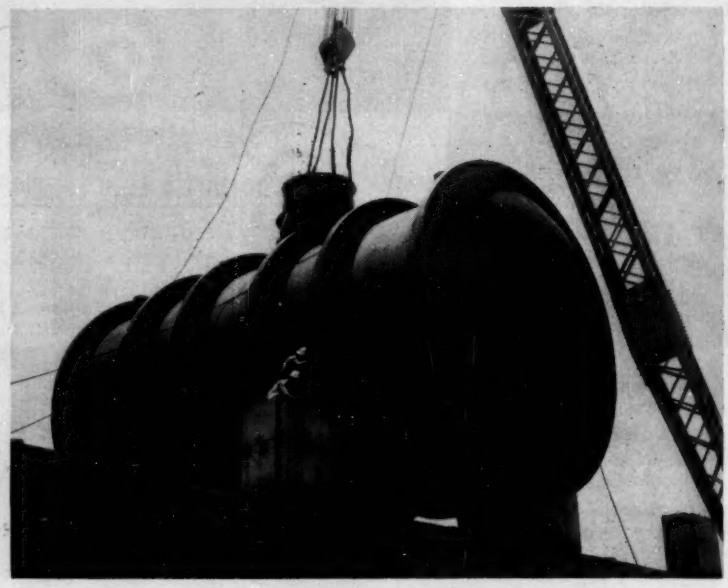
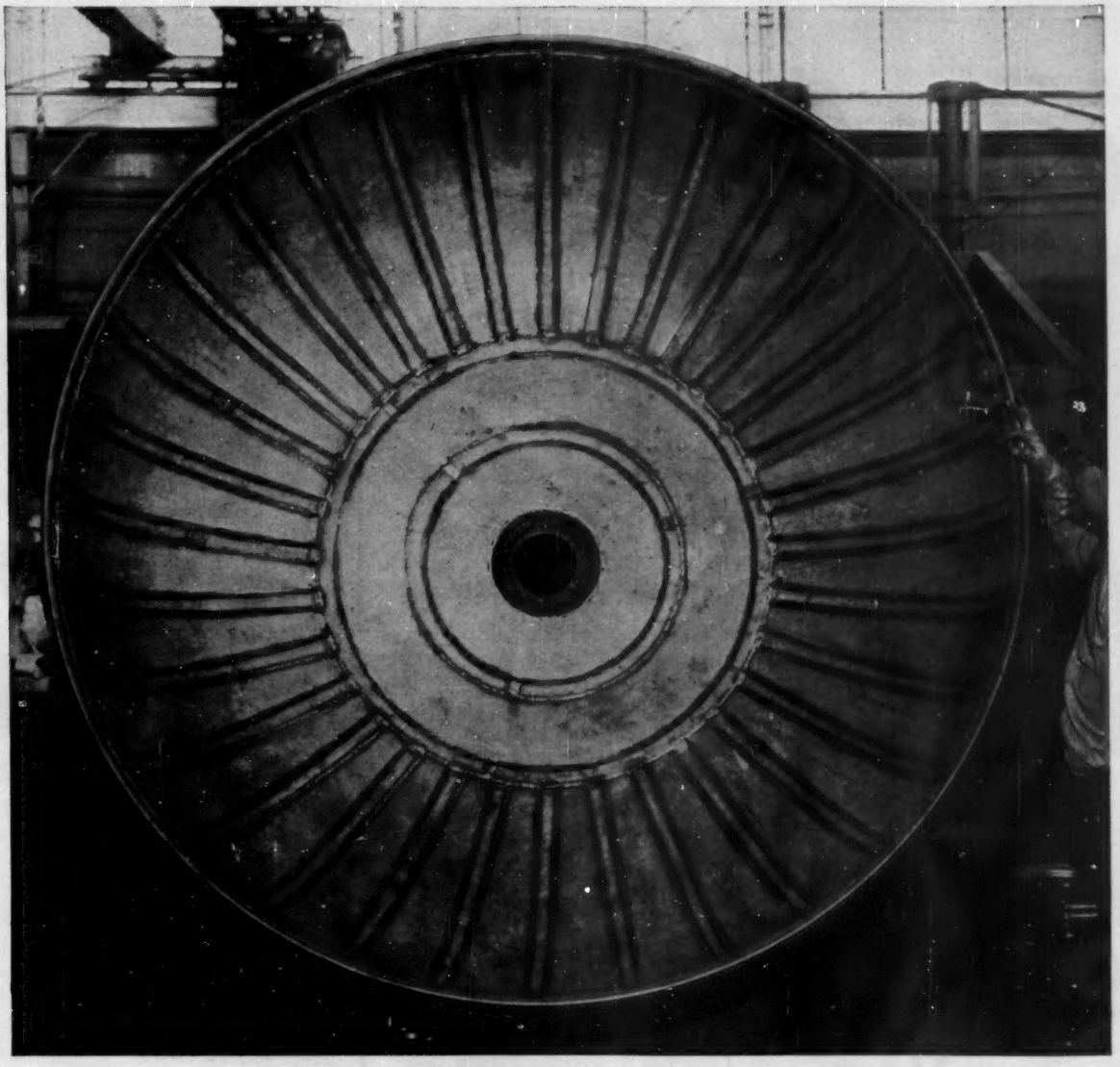
Butadiene Building Bustle

MOVING FAST toward a million tons/year level, U.S. butadiene capacity is expanding even faster than optimistic industry forecasts indicated less than a year ago (*CW, Jan. 28, p. 80*). In Texas alone, more than 200,000 tons/year of new capacity will soon be ready.

For example, due onstream in the first quarter of '57 is Texas Butadiene and Chemical's Lyondell plant near Channelview, Tex., (*above*). Its annual capacity: 65,000 tons of butadiene (originally estimated at 43,000 tons/year), and 2.5 million bbls. of 115/145 aviation gasoline.

Meanwhile, construction of Firestone Tire & Rubber's butadiene plant at Orange, Tex., is moving apace, will be completed about the same time. Equipment now being installed includes two 87-ton reactors (*below*). Reported capacity of the installation: 40,000 tons/year.





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Market Newsletter

CHEMICAL WEEK
November 17, 1956

The near- and long-term economic outlook for the U.S. sparkles with prosperity, apparently despite unsettled conditions in other parts of the world. There may be periods of minor dips and rises, of course, but on the whole the future looks bright.

That was the theme of a series of forums held late last week under auspices of the New York Society of Security Analysts. The occasion: a regional convention of Eastern groups of security analysts.

Some pertinent highlights of the many talks presented:

• Current capital expansion boom will up productive capacity of the country substantially; demand will keep pace, absorb much of the increased output.

• Keener competition will keep prices from rising faster than manufacturing costs, but in the long run, it won't prevent prices from being adjusted to cost increases.

More specifically:

• The nonferrous metals session heard that the aluminum supply outlook is the best in history, that copper availability promises to gain steadily, that titanium prices must be reduced to secure a sure foothold for the metal in industrial markets.

• Petrochemicals will maintain their "phenomenal" growth, and plastics, in particular, will continue rising spectacularly. Molding resins will grow at a rate of 8%/year; vinyl floor tile, which doubled in the last two years, will expand 19%/year until '60; foam insulation will grow at least 50%/year over the same period. Petrochemical ammonia, which was the source of most of the 2 million tons of nitrogen consumed in fertilizers last year, will benefit by an anticipated steady 10%/year growth in demand.

•

Right now, though, urethane foam imports are worrying U.S. producers. If imports continue to swell, makers may seek government relief under the tariff law's "antidumping" provisions.

Chief cause of concern are reports that a large German producer is sounding out U.S. consumers in hopes of finding a market for its large excess output. The German market, itself, is getting all the foam it can absorb, and U.S. imports from there—in the form of sheet stock or in finished products—have been rising steadily.

•

On the uptrend, too, is U.S. oxygen production. New installations under way or soon to be started by Union Carbide's Linde Air Products

Division, for instance, will hike oxygen producing facilities of the nation by some 50%.

The company, largest in the oxygen field, is building or has contracted to build some 30 installations that will boost capacity about 24 billion cu. ft./year. When these are completed, total U.S. capacity will stand at 72-75 billion cu. ft./year.

•

Indications of nickel's satisfactory progress toward ample supply may be behind the Office of Defense Mobilization's decision last week ruling out all direct government loans as output-increasing incentives. The agency had been mulling over financial loans to nickel producers (*CW, Nov. 10, p. 78*) to help cover "unusual development costs."

Sparking the announcement—and drawing first refusal—was Bethlehem Steel's request for a government loan (reportedly $100 million) to finance a nickel-processing project in Cuba.

•

Price-changing is going through mid-quarter inactivity. But few market followers expect the lull to last for long. Reason: not all items buffeted recently by higher labor and other manufacturing costs have been marked up to ease the serious profit margin pinch.

This week, for example, chromium oxide makers are slated to post new contract prices raising c.l. tags to 44¾¢/lb. and l.c.l. to 45½¢/lb. The advances follow increases earlier this month on chromic acid, some chromates and bichromates. But while prices of other chrome colors are likely to remain unchanged at current schedules, the trade fully expects revisions the first of the year on an extensive list of dry colors.

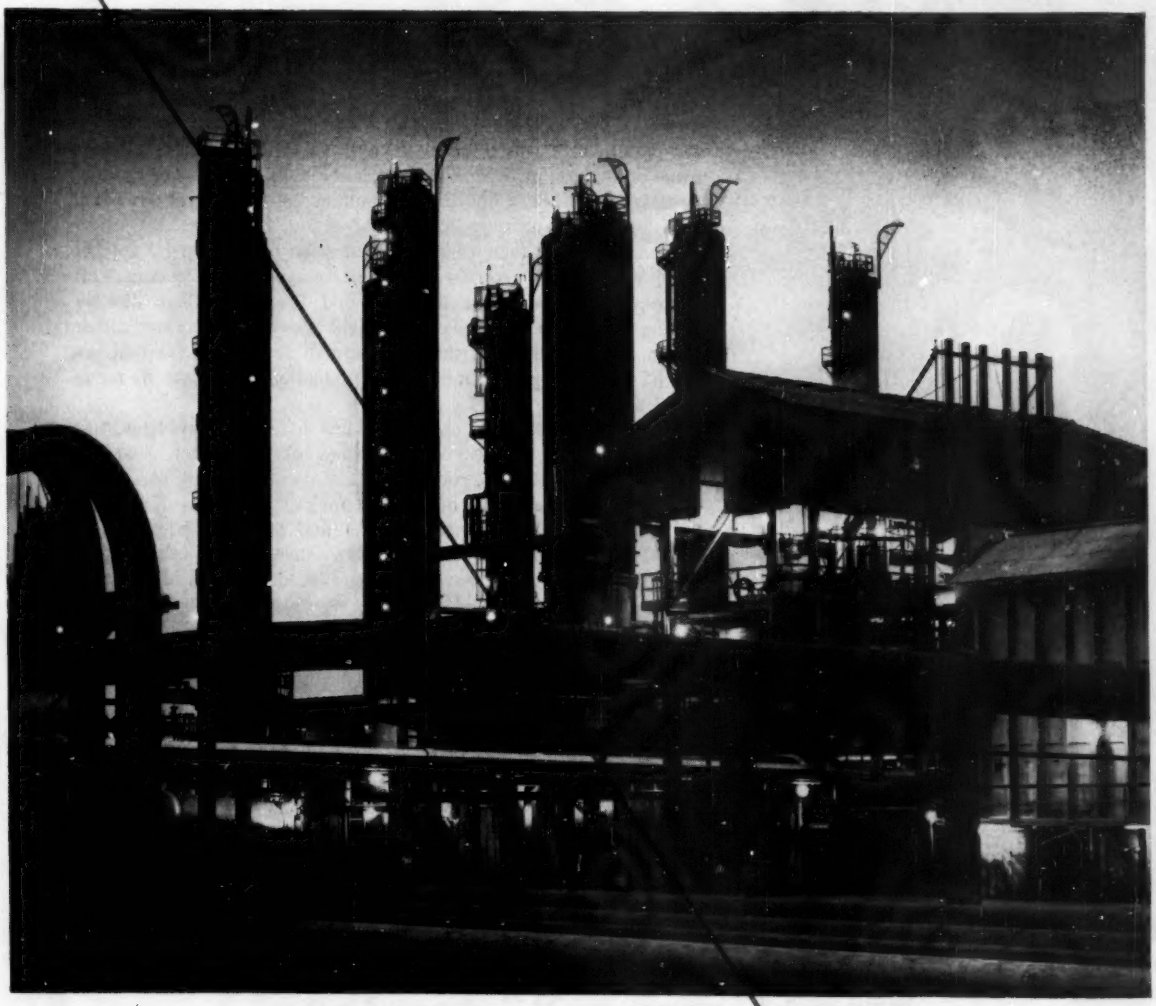
Talk of price-shading on some important phthalate plasticizers, particularly di-octyl, is less prominent since leading producers realistically cut listings 2¢/lb. last month, officially noting prevalent quotes.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending November 12, 1956

UP

	Change	New Price
Argentine casein, acid-precip., grd., bgs., c.l., duty-pd., lb.	$0.005	$0.245
Chromium oxide, pure, bgs., c.l., frt. alld., lb.	0.0275	0.4475
Lemongrass oil, cns., drms., lb.	0.10	1.75

we don't call it a day...at night



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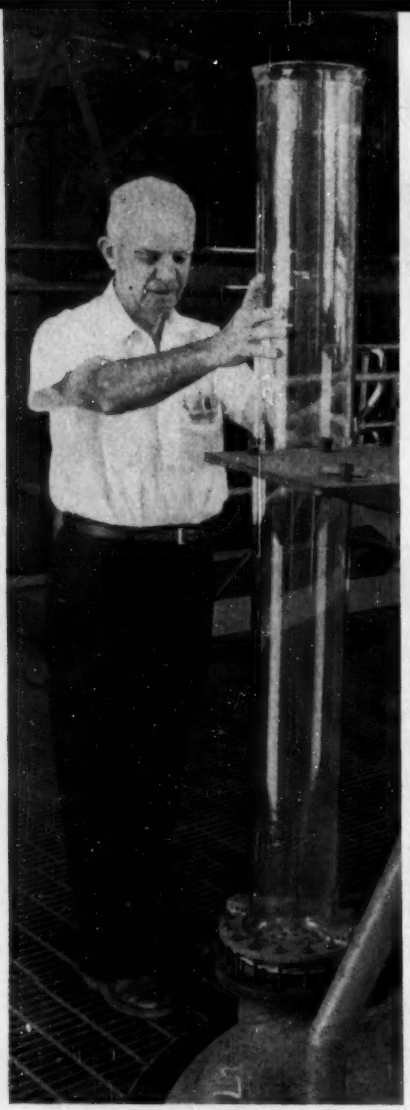


SOMERVILLE readies 2,4-D trial.

PRODUCTION

Catching Up with 2,4-D

Tackling a product as tricky to make as 2,4-D may not be the easiest way to break into a new processing field. But that's the way chosen by Chipman Chemical Co. (Bound Brook, N.J.) for its initial venture into the production of organic chemicals. Now in the midst of production shakedown runs, Chipman's $1-million 2,4-D plant at Portland, Ore., is scheduled to start commercial production soon.

Companies bigger than Chipman have been tripped up by 2,4-D's tricky processing and equally tricky marketing problems. And with such competitors as Monsanto, Dow and Diamond Alkali already operating large-scale 2,4-D plants, it might appear that any newcomer faces an up-hill fight. But, though Chipman readily admits that it's about 10 years late getting into 2,4-D production, it believes its move is justified.

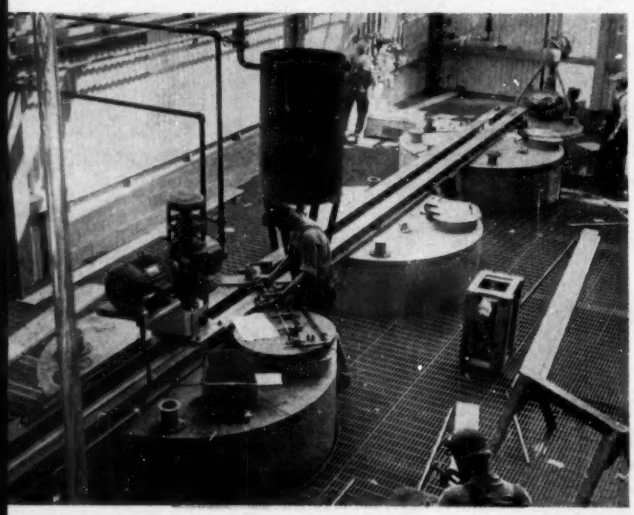
For one thing, Chipman anticipates few marketing problems, has captive uses for at least 50% of the new plant's output. And for another, as the only 2,4-D producer west of the Mississippi, it's ideally located to serve the needs of its two major customers—California Spray Chemical Co. (Richmond, Calif.) and Stauffer Chemical Co. (North Portland, Ore.). The site is also convenient to other major markets in the pacific Northwest, western Canada and the Midwest.

Too, Portland is handy to sources of raw materials for 2,4-D and other subsequent products (later the plant will make 2,4,5-T; 2-methyl, 4-chlorphenoxyacetic acid; monochloracetic acid). It's close to Pennsalt's Portland chlorine-caustic plant; phenol is available in ample supply from either Monsanto's Avon, Calif., sulfonation plant or Oronite's Richmond, Calif., cumene plant.

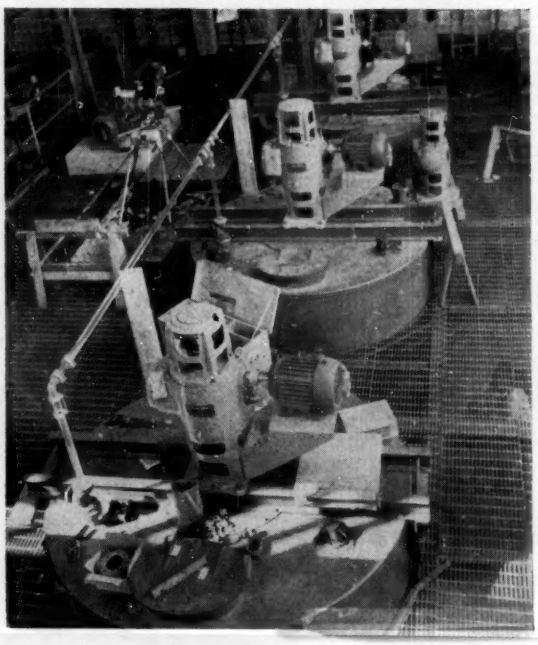
Pilot Bypassed: The 2,4-D process used by Chipman is an original one developed by Mike Somerville, designer and acting superintendent of the Portland plant. Based on accumulated know-how and laboratory work—with "due regard" for the many patents already issued on 2,4-D production—process units were designed without the benefit of pilot-plant work. Consequently, some of the key operating variables have not yet been pinned down, probably won't be settled until current shakedown trials have been completed.

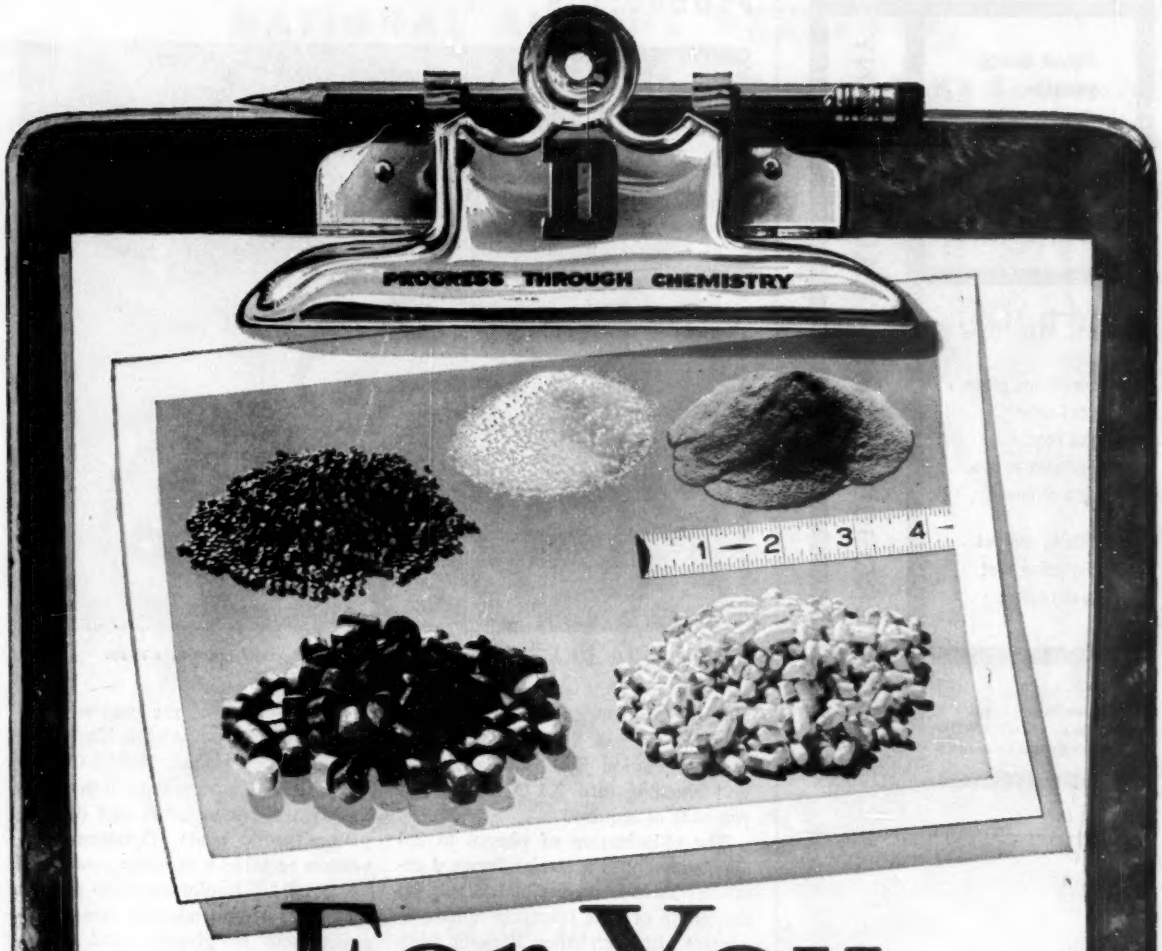
First the Acid: The process involves five consecutive operations—

WORKERS hook up kettles for condensation; these and . . .



ACIDIFIERS will turn out 2,4-D for esterification.





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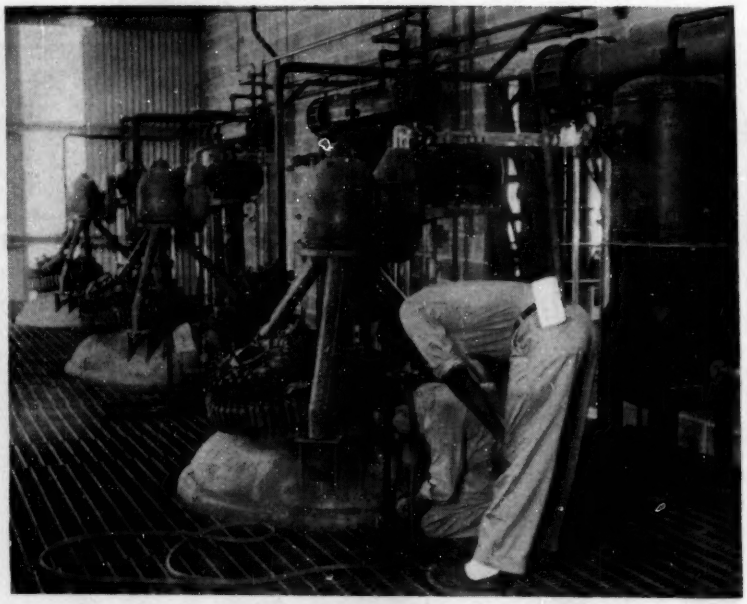

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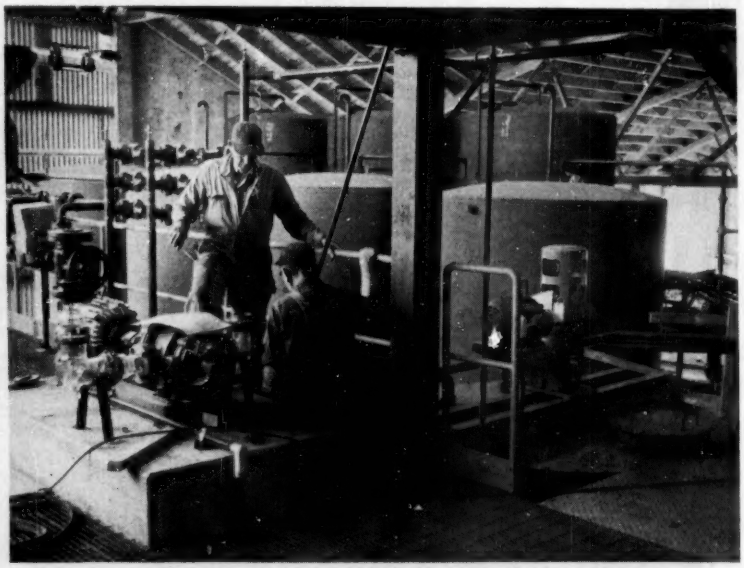
chlorination, condensation, distillation, acidification and filtration. Esterification, amination and standardization and blending turn 2,4-D into special products as required.

The chlorination of phenol to 2,4 dichlorphenol is a straightforward reaction. Yield is determined largely by the length of time reactants remain in contact with each other. Periodic analysis pinpoints the optimum chlorination time.

Trickiest part of the process starts with the condensation of dichlorphenol with monochloracteic acid. Carried out with 50% caustic soda, it produces the sodium salt of 2,4-D (2,4 dichlorphenoxyacetic acid). Optimum conversion requires a carefully controlled excess of 2,4 dichlorphenol to prevent hydrolysis of uncondensed monochloracetic acid to glycolic acid. Time, temperature, rate of addition and agitation all require critical control. Chip-



STORAGE TANKS (background) hold finished product for sale and blending.

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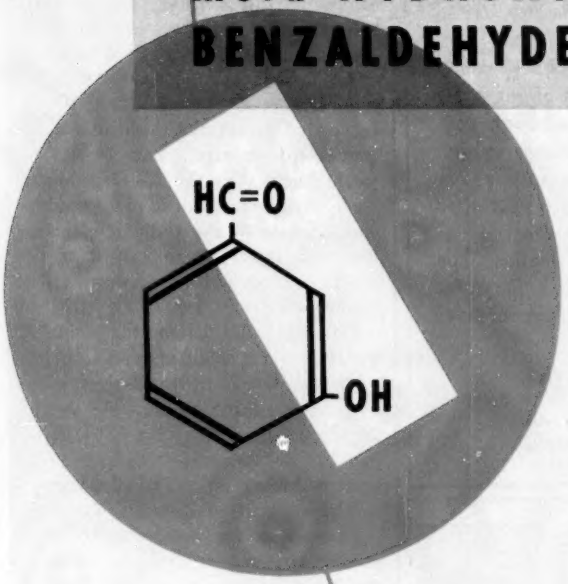
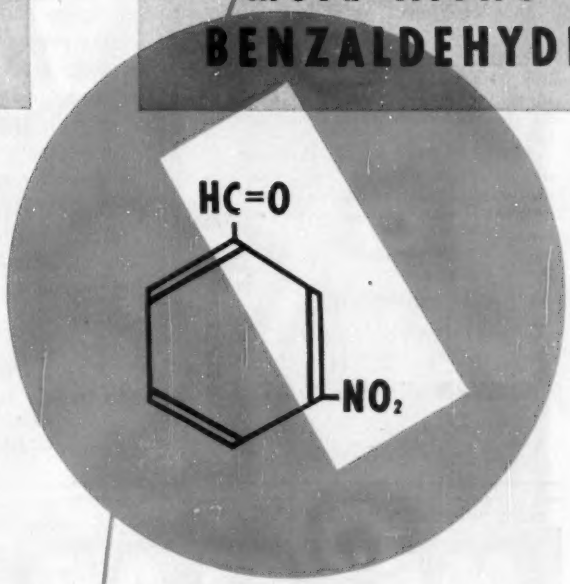
2-Reactive Meta-Substituted Benzaldehydes

meta HYDROXY BENZALDEHYDE



meta NITRO BENZALDEHYDE



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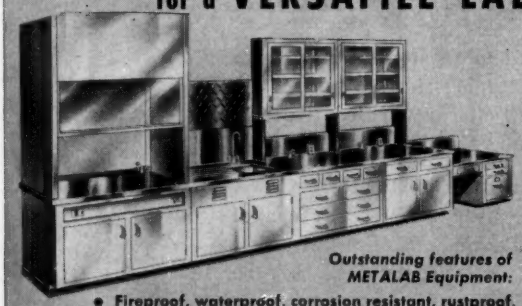

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man hopes to obtain yields as high as 90%—somewhat higher than other producers have admitted achieving.

Distillation to recover excess dichlorphenol is also tricky. But it's necessary because the phenol is too valuable to waste and, if not removed, has a deleterious effect on the finished product. Too, there's the problem of stream pollution; in the pollution-conscious Pacific Northwest, plants can't take chances with phenolic wastes.

Chipman licked the recovery problem, has been able to effect 100% recycle of excess dichlorphenol. Key: precise pH control. Because it's a weaker acid than the 2,4-D product, the phenol compound is more readily converted from the sodium salt into the acid form, which can then be steam-distilled and recycled with the condensate.

Following distillation, the stripped 2,4-D stream is acidified to about pH 1 by the addition of hydrochloric acid (a by-product of the chlorination step). At this acidity, all of the 2,4-D precipitates as the acid, which is then separated from salt and small amounts of glycolic acid by filtration, washing.

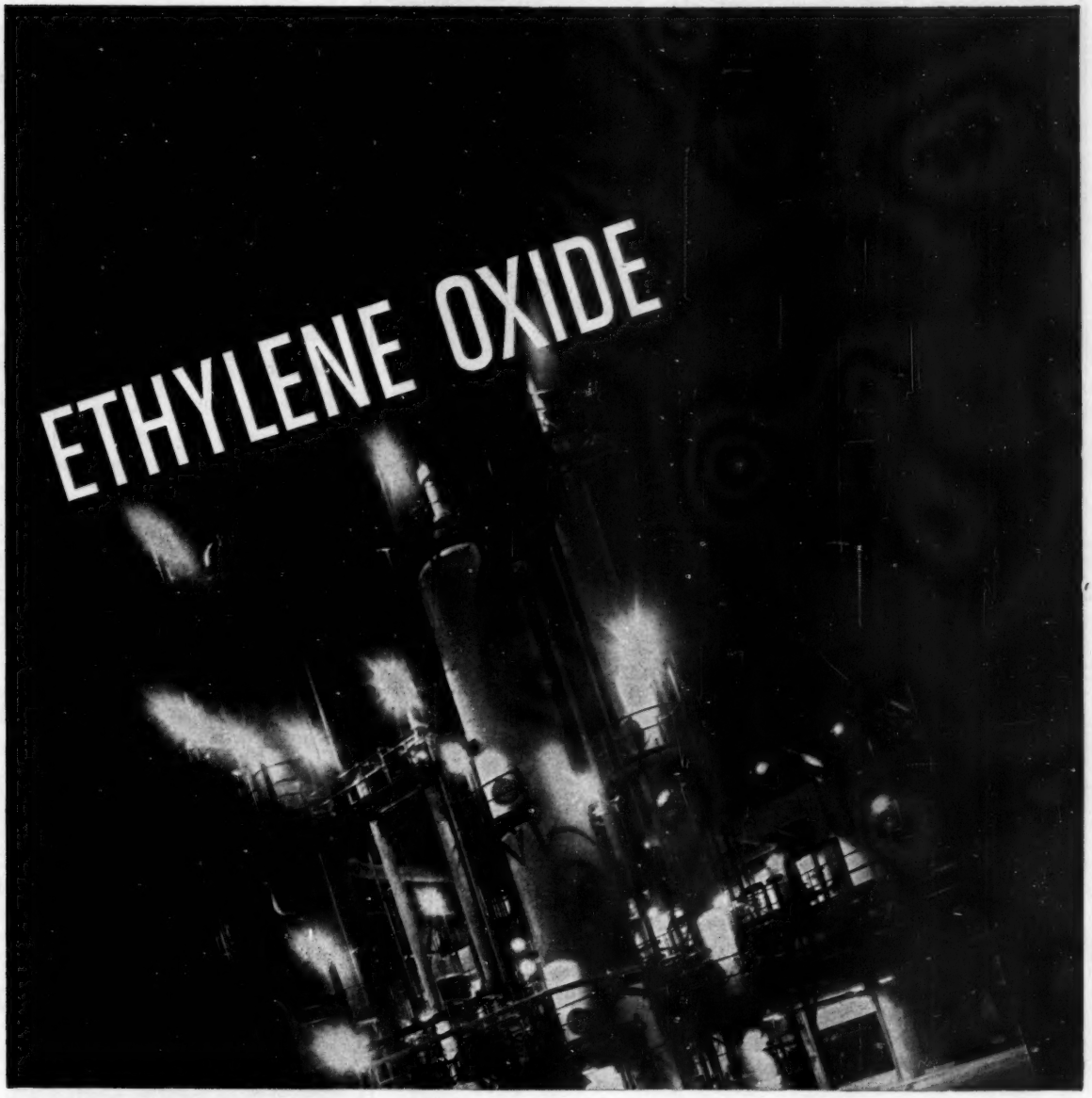
Conversion for Sale: Part of the product stream is esterified to the normal butyl, iso-propyl and iso-octyl esters of 2,4-D. These esters are essentially emulsifiable oils combined with an emulsifying agent in xylene, diesel oil or refined kerosene. Steam-jacketed esterification vessels provide pressures as low as 20 mm. for handling special alcohols, e.g., butoxy ethoxy propanol.

Chipman is now making small amounts of dimethyl amine; mono-, di- and triethanol amines; and isopropanol amine. These salts are produced by mixing the specific amine with 2,4-D acid in a water solution, then adding a sequestering agent to maintain the homogeneous solution.

Built-In Flexibility: Since a large share of Chipman's business is in the form of custom-blended products, it had the choice of either maintaining large inventories or providing adequate facilities for product standardization and blending. It chose the latter path, installed blending tanks that provide a maximum of flexibility for product finishing operations.

Despite its late start in the field, Chipman is convinced that the Portland plant will put it in the running. The company won't waste any time trying to catch up to earlier entries.

if you're considering its use . . .



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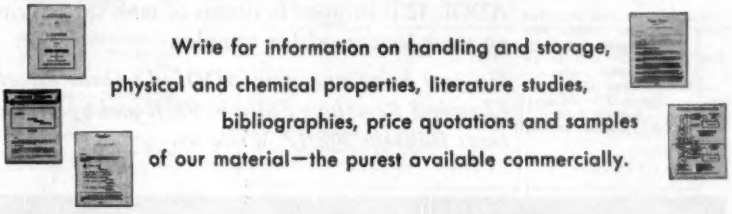

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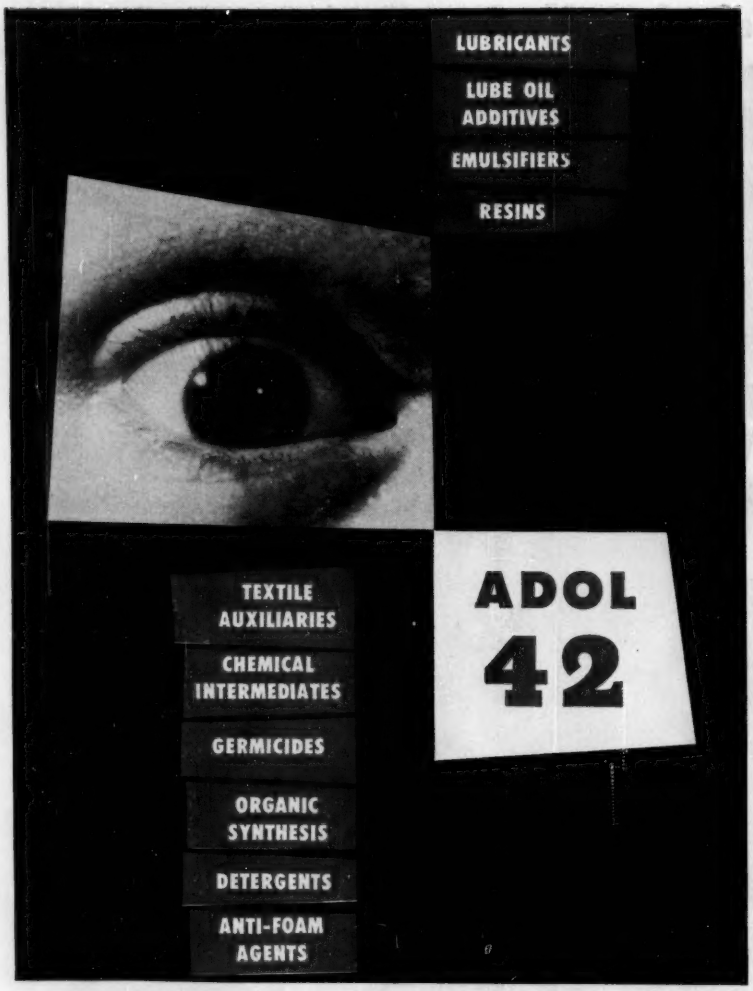

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PRODUCTION

Who Spends It . . .

Chemical Process Industry	Expenditure (millions)
Chemicals	$ 476
Coke and by-products	8
Drugs and medicines	47
Explosives and fireworks	10
Fertilizers	42
Glass and ceramics	286
Leather	12
Lime and cement	130
Metallurgical and metal products	66
Oils and fats	62
Paints, varnishes, pigments	42
Paper, pulp and board	222
Petroleum products	391
Plastics materials	26
Synthetic fibers	70
Rubber products	69
Soap, glycerine, cleaning, etc.	21
Other chemically processed products	145
Total	**$2,125**

$2 Billion

An ambitious new survey finds the chemical process industries spending more than $2 billion/yr. for equipment. And just how the CPI's 18 individual members spend their money is shown in the tables above.

The figures have been skimmed from a just-completed McGraw-Hill Research Dept. survey of annual equipment expenditures in CPI.

Management at more than 10,000 plants were questioned—more than 500 of the largest firms were queried in field interviews. And 230 different items of equipment and construction materials were included in the major groups summarized in the table (*above, right*).

Even so, the survey has its limita-

How They Spend It . . .

Equipment	Expenditures (millions)
Materials handling	$ 188
Liquid, gas and air handling	446
Disintegration	43
Mixing	28
Chemical reaction	47
Heat transfer and towers	114
Dry separation	29
Wet separation	37
Dryers and kilns	79
Air conditioning and refrigeration	49
Power transmission	59
Steam and power generating	90
Lubrication	4
Electrical	163
Measurement and control	94
Coating, forming and agglomerating	16
Construction materials for equipment*	423
Plant construction and auxiliary service	216
Total	**$2,125**

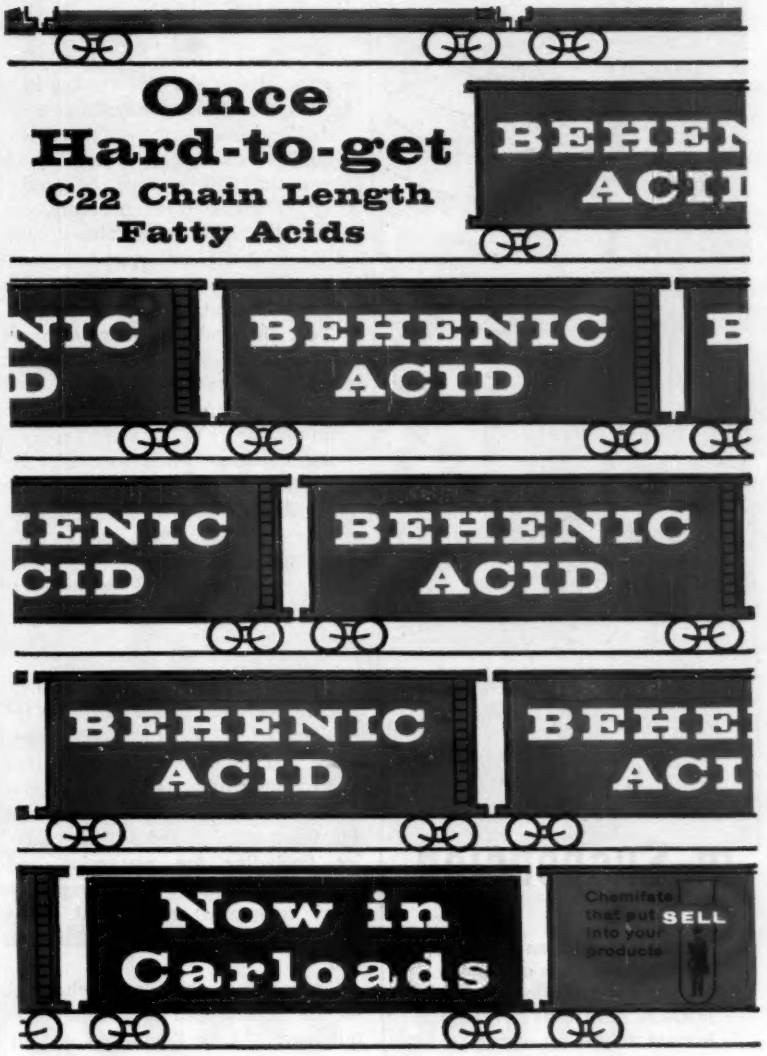
Except piping and tubing.

for Equipment

tions. It does not, for instance, include the purchase of items by engineering and construction firms that build plants and package units on a "turnkey" basis.

Big Spenders: The basic chemical makers run up the biggest equipment bills. They shell out $476 million each year—better than $80 million more than petroleum processors, who rank second in spending. Glass and ceramics makers rate third.

Chemical producers top CPI dollar spending in eight categories: construction materials for equipment; plant construction and auxiliary service; electrical; measurement and control; chemical reaction; mixing; dry separation; coating, forming, agglomeration.



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AVERAGE SPECIFICATIONS

Titre	69 to 73°C
Acid Number	168 to 174
Iodine Number	4 (Max.)
Saponification Number	169 to 175
Average Molecular Weight	320 to 332
Specific Gravity @ 100/25°C	0.8286
Color (5¼" Lovibond)	Max. 25 Y/2.5R

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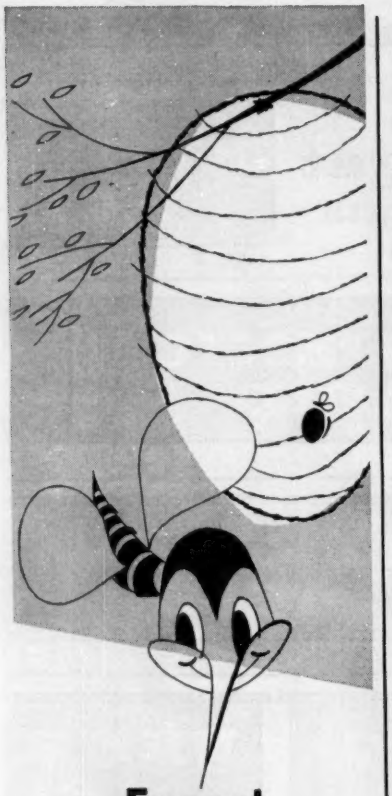

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PRODUCTION

Yet, from a percentage standpoint, they are below the CPI average in at least two of these: construction materials for equipment; and electrical. Also, in terms of percentages, they are above the CPI average in another two: chemical reaction equipment, where they account for almost 50% of the total CPI outlay, and measurement and control, where it's over 25% of the CPI total.

Too, chemical makers spend more than the average for heat transfer and tower equipment (over 30% of total CPI outlay), but are topped by petroleum processors in this category.

Big Expenses: Three categories account for over half of CPI's equipment dollar. Largest chunk of the money goes for liquid, gas and air handling equipment—e.g., pipes and hose, valves, fittings, pumps and compressors. Chemical makers spend 27% of their total outlay here, but still rank second to petroleum processors.

CPI digs almost as deeply into its pockets for construction materials for equipment (e.g., metal sheeting, plates, strips and rods; wire cloth; castings and forgings; rubber and plastic sheeting and rods; insulating materials). Plant construction and auxiliary service (including fire prevention and safety, water supply and sewage disposal equipment) rates third, takes about half as much as each of the other two.

According to the survey, chemical makers allocate their equipment dollar this way: 27¢ for liquid, gas and air handling; 16¢ for construction materials; 11¢ for plant construction and auxiliaries; 9¢ for heat transfer and towers; 7¢ for materials handling; 30¢ for all others.

PROCESSES

High-Melting-Point Naphthalene: A new crystallization-centrifugation process for the production of high-melting-point naphthalene has been unveiled at Lancashire Tar Distillers Ltd. (Cadishead, England). The process, designed and installed by Proabd (England) Ltd., starts with crude naphthalene oil from the primary distillation of crude tar.

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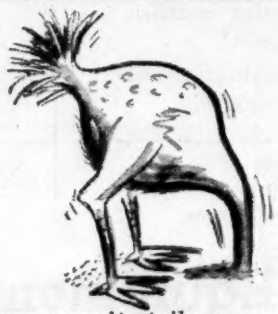

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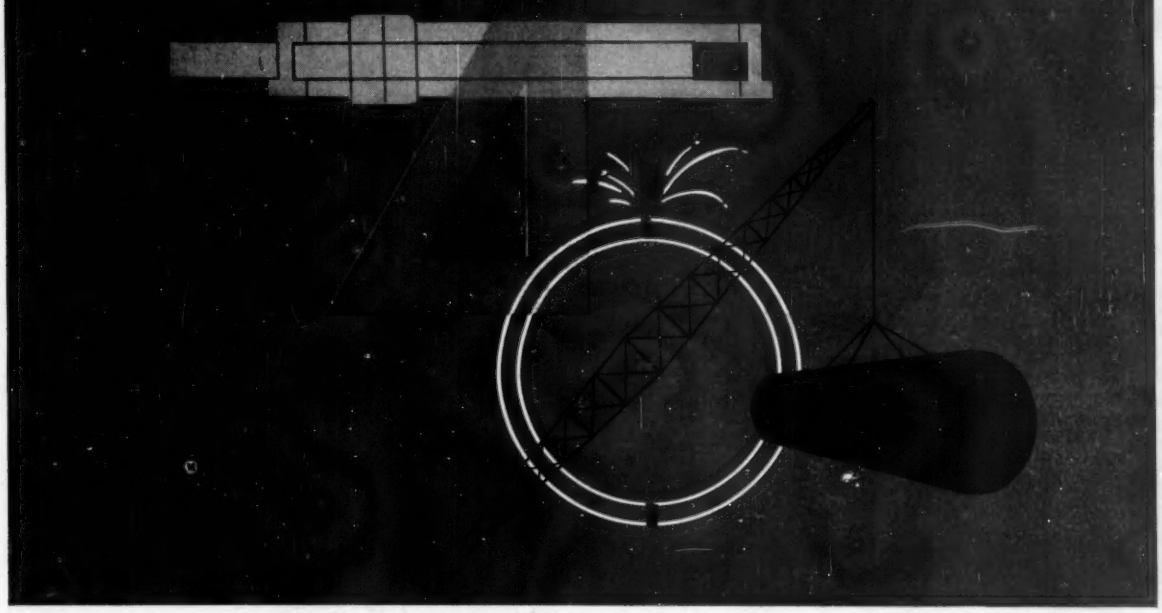

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Petro-Tex Chemical Corp., owned jointly by Food Machinery and Chemical Corp. and Tennessee Gas Transmission Co., is expanding its large butadiene plant in Houston and building a new laboratory and pilot plant for research and development on petrochemicals. The following attractive supervisory and research positions are now open:

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Personnel Department

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P-3309 Chemical Week
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dry-spun. At this stage, the naphthalene contains up to 7% water, has a crystallizing point above 78 C. It may be bagged for sale or melted for dehydration.

Key to the dehydration is a specially designed decanter that utilizes the small density difference between water and liquid naphthalene to make the separation.

The dehydrated, hot-liquid naphthalene contains less than 0.01% water, can be transported directly to phthalic anhydride makers or converted into a solid on a drum flaker.

•

Wood Preservation: The Division of Forest Products, Australian Commonwealth Scientific and Industrial Research Organization, has developed a process for diffusing preservatives into building timbers. Based on a simplified cold-dip treatment for green veneer, the new process is said to be less expensive than those in use—e.g., it does away with large tanks and steam for treating green timber of scantling size. The timber is dipped into a cold boron-fluorine solution, then stacked in blocks for several hours to permit diffusion into the wood before drying.

Arsenic and chromium compounds, added to the solution, increase toxicity to bacteria and insects, add to the total amount of preservative. Only a small proportion (less than 20%) of the salts settles out of a room-temperature solution, so frequent chemical analysis is not necessary. Penetration reportedly occurs in both heartwood and sapwood. But treated wood can't be used in contact with the ground or other places where leaching occurs, unless the preservatives are fixed in the wood with a second diffusion treatment using a heavy metal salt.

EQUIPMENT

Signal Converter: A new computing device that converts pneumatic signals for a variety of control circuit applications is Minneapolis-Honeywell Regulator Co.'s Sorteberg force bridge. The unit converts square-root signals into linear form, can also multiply, subtract, divide or square pneumatic outputs.

•

Gas Filter: Purolator Products, Inc. (Rahway, N.J.), has come up with a high-pressure filter for removing abrasive particles, other contaminants from gaseous product streams. Intended to protect turbine expanders, compressors, pumps, nozzles and blowers, the resin-impregnated cellulose filter elemments have a reported efficiency rating of 99% for the removal of U.S. standard test dust (fine). Elements are contained in housings that comply with ASME boiler and pressure vessel code specifications.

•

Infrared Analyzer: The new electronic infrared analyzer offered by Mine Safety Appliances Co. (Pittsburgh) is said to provide quick, accurate analysis of a single component in simple or complex mixtures of gases or liquids. Tagged LIRA Model 200, it's a simplified version of MSA's more-expensive Model 100, has a higher speed of response (90% of final reading in 5 seconds) with the same measuring accuracy (plus or minus 1% of full scale). The analyzer operates on the principle of direct deflection, may be used with integral indicating meter or recorder.

•

Plastic Valves: Chemtrol Corp.'s (Lynwood, Calif.) new rigid polyvinyl chloride valves are designed for continuous-duty operation at pressures to 170 psi. and, in low-pressure systems, at temperatures to 170 F; they may also be used at higher temperatures for intermittent-duty operation. Two types—Micro-Meter needle valves and Micro-Flow globe valves—are available in ⅛- and ¼-in. pipe sizes, ⅛- to ⅜-in. O.D. male tube connections.

•

Spray Nozzle: Spraying Systems Co. (Bellwood, Ill.) is out with a new, large-capacity, flat-spray nozzle designed for heavy-duty cooling and washing operations. Called 2-U-Veejet, it has no cores, vanes, other obstructions, comes in a choice of two spray angles. Capacity is 73 gpm. at 15 psi., 330 gpm. at 300 psi. The nozzle has a 2-in. male pipe connection.

•

Corrosive-Fluids Pump: Vanton Pump & Equipment Corp.'s (Hillside, N. J.) new pump has both body block and liner of Teflon or Kel-F, will handle most corrosive fluids at temperatures up to 300 F. Pump capacities to 5 gpm. with pressures to 50 psi. are offered.

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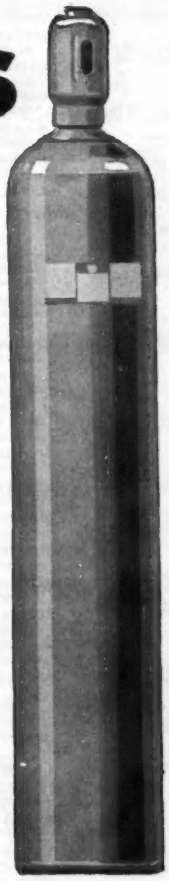

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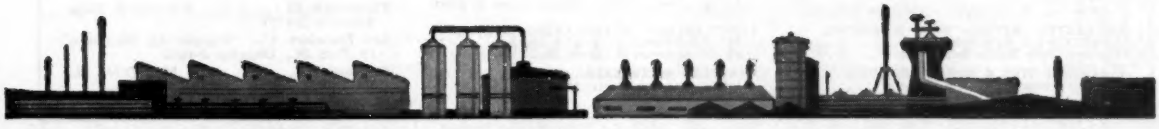

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